SEPTEMBER 27, 1954

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

TIN PLATE

Production hits record levels as more Americans buy more goods in cans—
page 135

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$7.40	$7.65	$8.05
Fairfield, Ala. T2	7.50	7.75	8.15
Fairless, Pa. U5	7.50	7.75	8.15
Gary, Ind. U5	7.40	7.65	8.05
GraniteCity, Ill. G4	7.60	7.85	8.25
IndianaHarbor, Ind. I-2, Y1	7.40	7.65	8.05
Irvin, Pa. U5	7.40	7.65	8.05
Niles, O. R2	7.40	7.65	8.05
Pittsburg, Calif. C11	8.15	8.40	8.80
SparrowsPoint, Md. B2	7.50	7.75	8.15
Weirton, W.Va. W6	7.40	7.65	8.05
Yorkville, O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb	Weirton, W.Va Yorkville O
Aliquippa, Pa. J5	$8.70	$8.95	
Fairfield, Ala. T2	8.80	9.0[illegible]	
Fairless, Pa. U[illegible]	8.8[illegible]		
Gary, Ind. [illegible]			
[illegible]			

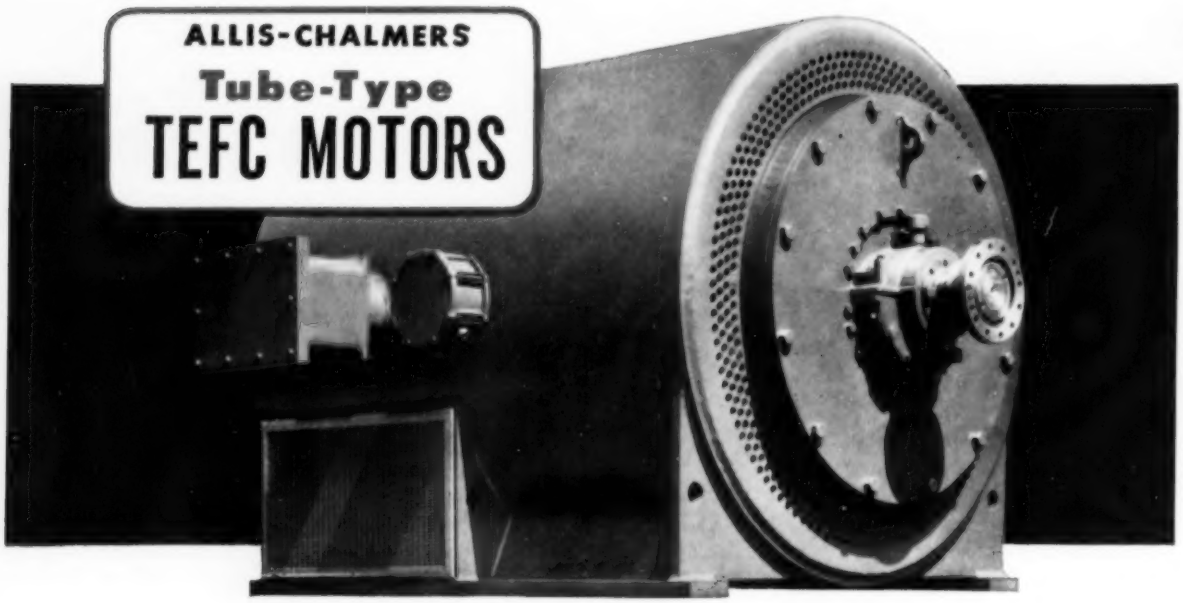
✔ **Industry Sizes Up Pallet Standards, p. 46**

✔ **Hydrogen—Welding's Big Troublemaker, p. 84**

CONTENTS — PAGE 5

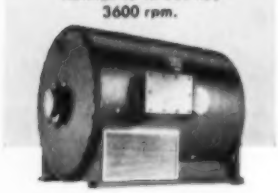
NOW 1250 Hp – 1780 Rpm Underwriters' Approved

for Class I, Group D Service



Allis-Chalmers explosion-proof motors as large as 1250 hp, 2300 volts, 1780 rpm are now available with Underwriters' Laboratories, Inc. labels for operation in Class I, Group D hazardous locations.

Ratings up to 800 hp, 3600 rpm.



Construction used for larger ratings.

Previous to recent tests, the Allis-Chalmers Underwriter-approved motor line included ratings up to 800 hp, 3600 rpm for operation in Class I, Group D and Class II, Group F and G locations. Now, with the design used for larger ratings also Underwriters' test-proved, Allis-Chalmers can supply explosion-proof motors in other ratings required by industry.

Explosion-Proof Plus

Operation-proved by TEFC motors totaling over a quarter million horsepower, the A-C tube-type air-to-air heat exchanger design combines safety and maximum operating economy. Self-cleaning action cuts maintenance. Full internal air circulation lengthens insulation life. Complete enclosure protects stator core and other electrical parts from dirt and corrosion.

For approved motors for hazardous dust and gas locations, contact your A-C representative, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4436

ALLIS-CHALMERS

With the new addition, the University of Washington's stadium holds some 55,000 people. Mayari R was used for the seat brackets primarily for high tensile strength and corrosion-resistance.

Steel for 7,000 seat brackets had to be formable, weldable, corrosion-resistant

Everybody loves a football game, it seems, and so the University of Washington decided to enlarge its stadium by 15,000 seats. To support the new seats, 7,000 steel brackets were needed. They had to be strong, of course, and able to endure constant exposure to the atmosphere. They were to be formed from channels to the shape shown at right, and then welded into position.

These requirements led Century Metal Works, Seattle, who fabricated the brackets, to select Mayari R high-strength, low-alloy steel. Because it has 5 to 6 times the atmospheric corrosion-resistance of plain carbon steel, and nearly 50 pct greater tensile strength, designers knew that Mayari R would provide safe, long-lasting seat supports.

Century Metal Works found that they could cold-form Mayari R in practically the same way as plain carbon steel, without any special equipment. Welding the brackets in place posed no problems, either, since Mayari R welds as readily as any steel, and more readily than some.

These seat brackets illustrate how manufacturers and fabricators can take full advantage of Mayari R's superior qualities without having to adopt special shop techniques or equipment. The cold-forming, hot-forming, shearing, flame-cutting, punching, machining or welding of this versatile steel require little if any variation from normal procedures.

Our new Catalog 353 digs pretty thoroughly into Mayari R's properties and possibilities. You'll find this book worth having. You can get a copy through the Bethlehem office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mayari R *makes it lighter... stronger... longer lasting*

with TOCCO Induction Heating

Mechanics Universal Joint Division of Borg-Warner Corporation now combines automatic heat-treating and metal-working operations on the same machine!*

A Tocco Inductor Coil, matched to one spindle of a multiple spindle automatic screw machine, heat treats the inside diameter of automotive trunnion cups—after they have been completely formed on the same machine tool. Twenty-two, 20 and 50 kw, 450,000 cycle TOCCOtron Induction Heating units and 44 automatic screw machines (installed here and in other plants) make up this high-speed production team.

This new method permits the use of SAE 1144 steel and eliminates costly, time-consuming copper plating and carburizing operations formerly required. Heating and quenching cycles total approximately 10 seconds per part, and production is in excess of 300 parts per hour from each machine.

If your products or their components require heat treating, soldering, brazing or forging it will pay you to investigate TOCCO for better, faster ways of producing them at lower unit cost.

*A patented process.

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Company_____

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City_____ Zone____ State_____

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HERE'S HOW TO KEEP
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Repeats quality at low cost 135,000 times a day with *OSBORN* Core Blowers

EVERY six seconds, an Osborn Core Blower turns out a quality core in this foundry. The operator simply loads the core box. The machine automatically blows and ejects the core box. With 29 such machines, the foundry produces 135,000 cores a day at low cost per core.

CONSULT OSBORN FOR LOW COSTS. It will pay you to look to Osborn's newest developments in molding machines and core blowers to realize savings like these in your foundry. The Osborn man who calls on you is a factory-trained foundry specialist. Benefit by his experience. Have him study your operations and show you how to cut production costs. Call or write The Osborn Manufacturing Company, Dept. EE-23, 5401 Hamilton Avenue, Cleveland 14, Ohio.

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OSBORN

MOLDING MACHINES CORE BLOWERS

Veeder-Root Hand Tally counts anything you see. Press thumb lever once for each count. Reset to zero with one turn of knob. $8.30 ea. (Write for quantity prices.) Immediate delivery.

If this Clicks often enough... then the show clicks, too!

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275 laughs in 113 minutes . . . this was the certified count taken at a recent performance of a Broadway show by two executives of Fact Finders Associates, Inc. . . . both using Veeder-Root Hand Tallies.

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Offices and Agents in Principal Cities

"The Name That Counts"

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 135 No. 13 September 27, 1954

✓NEWS ✓PRODUCTION-ENGINEERING ✓MARKETS

Metalworking Outlook 33

As the Editor Views the News 37

Industrial Pallets: Is Standardization Possible? 46
Standardization still isn't accomplished, even though more and more industrialists agree that it's desirable

Windows of Washington 48

Budgeting for Middle Management 52
Budget is usually considered in terms of planning for whole company. Special departments can pay off

Mirrors of Motordom 55

The Business Trend 59

Men of Industry 63

Technical Outlook 83

Hydrogen—Welding's Big Troublemaker 84
Part I—Hydrogen is at the root of most weld defects. Expert tells why, gives ideas for minimizing difficulties

Selective Hardening by Flame Heating 86
It's possible to control core property and case relationship, depth and location of case and tensile strength

A Way To Handle Sand Ingredients 89
Corn and silica flour core received in bulk and delivered to storage, then process, by a conveying system

Progress In Steelmaking 90
Correlating Blast Furnace Operating Concepts—Core reducibility depends on heat applied, thermal needs

Fixtures Aid Valve Production 104
Indexing fixtures add to versatility of turret lathe. Concentricity is one benefit

New Products and Equipment 109

The Market Outlook 121
Metal Prices and Composites begin on page 122

Nonferrous Metals 124

Behind the Scenes 6
Letters to the Editors 10
Calendar of Meetings 27
Foreign News 51
Obituaries 66
Helpful Literature 116

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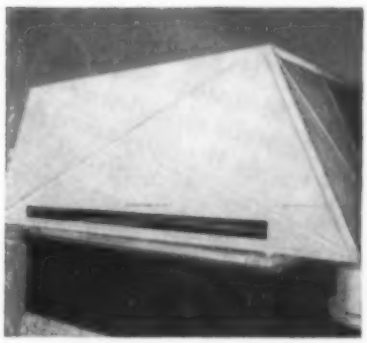
THIS PLA-TANK® HOOD SAVED ITS COST IN A YEAR



The PLA-TANK Hood shown above has been in continuous use at General Electric's small aircraft engine department in West Lynn, Mass., for over a year. Reports indicate that it is still as good as when originally installed, is already credited with saving its entire cost since no previously used material had lasted over a year.

The tank is used for etching stainless steel billets; solutions used are aqua regia at room temperature and a 50% solution of muriatic acid at 180°F. PLA-TANK has successfully withstood these fumes, where other materials failed.

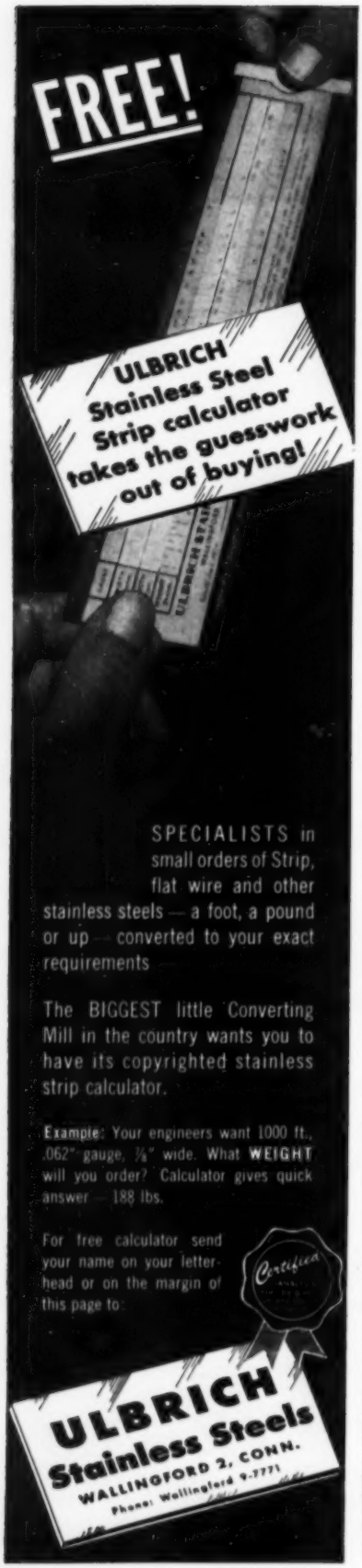
PLA-TANK products are daily solving problems of all types in the chemical and electroplating fields. They replace or outlast stainless steel, lead and ceramic linings, plywood coated with corrosion preventatives, phenolic plastics and asbestos cement board structures in many applications.

PLA-TANK, molded from long-life, resin-bonded glass fibre laminate, is now resistant to a wider variety of fumes and temperatures than ever before. PLA-TANK is light weight, easy to install, competitively priced.

Let us help you solve your problems the modern way — with PLA-TANK. Write today for free data sheets.

P-21

THE Chemical CORPORATION
56 Waltham Ave., Springfield 9, Mass.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behind the scenes

Tampering With Index

Last week it came as a mild shock to learn that a pair of STEEL's editors have been toying lightly with STEEL's highly regarded Industrial Production Index. As all our readers know, this Index tells at a glance what freight cars are doing in the matter of loading; the rate at which new autos are appearing; the number of steel ingots that turn up weekly, and all like that. Just as certain newspaper readers pounce first upon their favorite feature (baseball standings, horoscopes, lunar feeding tables, etc.), many STEEL readers dive right into the Industrial Production Index. Imagine, then, our great concern when Assistant Editor Bob Jaynes confessed that he and Assistant Editor Jim Morrissey had been attempting to parlay the Industrial Production Index into a tin roof.

"It's easy," said Jaynes. "Jim bet the Fourth of July weekend figure wouldn't fall below 125, and I bet that it would. I won. Now we have a bet on for November 8, and the winner gets a tin roof."

We asked him how he and his gambling confederate arrived at their estimates.

"Just takes a little study and a little common sense," replied Jaynes briskly. After all, he had won the first bet, and he exuded all the confidence of a Christian holding four aces. "Production is on a long, slow climb. Freight cars will be loading Christmas goods. More steel will be required for building, and so on. I estimate that the Industrial Production Index figure for the week of November 8 will stand at 126.5, Morrissey claims it will be 125.3"

Maybe you might want in on the bet. It won't be as exciting as betting on when the ice goes out of the Yukon, but it will give you an opportunity to guess against a pair of editors. Every guesser will receive a cartoon reproduction of a gambler —and the winner, of course, gets a tin roof.

Big Din in Tin (plate)

Tinplate in doing much better than last year. The story that Bob Love sends in from Pittsburgh (see cover) contains an amazing collection of facts concerning the ups and downs of that remarkably sensitive business barometer, tinplate. Tin itself is really some queer stuff: when kept in deep freezing temperatures, it will crumble to gray dust. When you bend a tin bar, it will cry. And when demand for tinplate falls off, manufacturers cry, too. If you are interested in tinplate and its wide ramifications, don't miss Love's story.

Metalworking—Wow!

Market data is always fascinating. Maybe the dear little old ladies who quiver with delight when Liberace smiles at them archly from their television sets might not be knocked off their feet by the news that during 1953 there was a monthly average of 7.8 million persons employed in metalworking plants—but nevertheless that news affects every one of those dear little old ladies; and Liberace, too, for that matter. In 1939 about 31% of all persons employed in the manufacturing industries were employed in metalworking plants. Today it's 46%! Some of those workers made Liberace's candelabra, and the wires for his piano, and stays for the little old ladies' corsets, and rims for their spectacles, and bolts for their television sets.

Play Ball

With the World Series about to take place under our very nose, as it were, we are reminded of a wry remark made by Tiger Farnsworth, member of STEEL's editorial art department. A stranger asked him, "About how many people work in the Penton Building?"

"About half of them," came the quick reply.

As the crowds surge past the building toward the Cleveland Stadium, only a hop, skip and jump from STEEL's front door, Farnsworth's remark will bear investigation. With expected crowds of 85,000 milling out there on West 3rd Street, and the whole town gone baseball crazy, only solemn devotion to duty will keep Penton personnel on the job.

Shrdlu

(Metalworking Outlook—Page 33)

At the '54 Metal Exposition—Nov. 1-5 . . .

50,000-PLUS METALS INDUSTRIES MEN

WILL LEARN NEW WAYS OF CUTTING COSTS!

Your competitors . . . thousands of 'em . . . will be on hand at this great industrial event to check closely on everything that's new and improved . . . everything that will help them build better products . . . cheaper . . . faster!

They'll come from all corners of the land . . . these 50,000-plus metals industries men . . . and they'll take away with them, when this great Metal Show ends, more ideas . . . more information and more know-how than any 'stay-at-home' executive could possibly match!

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Builders of practical industrial and automotive hot spray equipment.

Please send me information on your line of hot spray heaters best suited to our work. Type of products being finished _____

Application is conveyorized _____ turntable _____ mobile _____ other _____

Average volume of material per gun per hour _____

Type of material _____ Please have representative call _____

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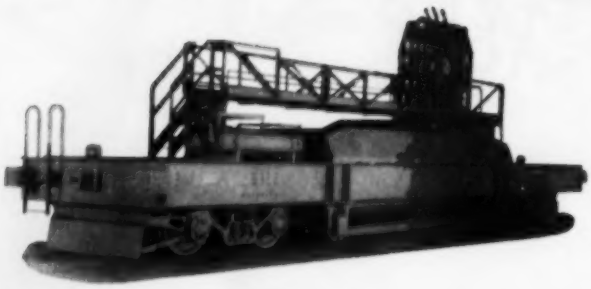
City _____ State _____

5141

Time has proved . . .

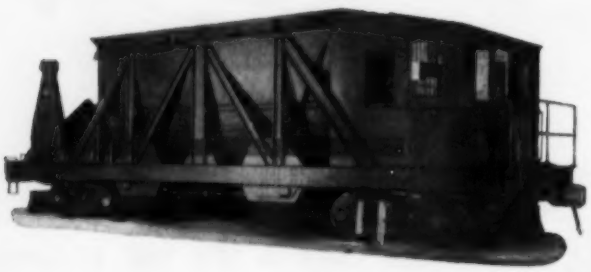
ATLAS

Builds Dependable Equipment



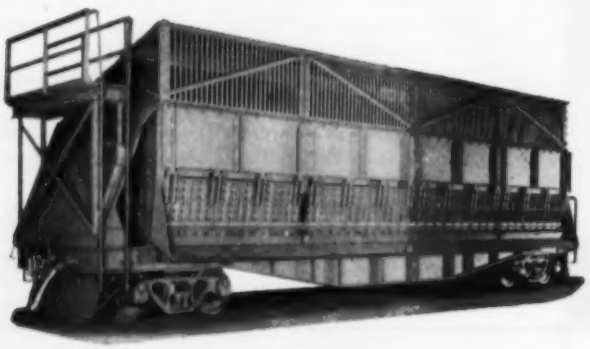
30 Ton Double Hopper Bottom Scale Charging Car. Operator's platform is above hopper to facilitate bin operation.

SCALE CARS



ORE TRANSFERS

60 Ton Center Bottom Dump Ore Transfer Car. Equipped with pneumatically operated balanced type pusher arm.



Coke Quenching Car. Motor-operated cast steel discharge gates. Bottom, ends and front are abrasive resistant steel plate.

COKE QUENCHERS

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Salt Test Dissent

Is it possible to obtain tear sheets of the article by Louis Schlossberg, Quaker Chemical Products Corp., entitled, "Humidity Cabinets Don't Tell the Whole Story" (July 12, p. 114)?

We are most interested because makers of many types of coatings use such tests in an effort to show that their products are "as good or better than hot dip galvanizing." Even some commercial laboratories employ the "salt spray test" for the same purpose.

We have always maintained that this is not a true and accurate method of testing hot dip galvanizing and refuse to accept salt spray test results as applied to zinc coatings by the hot dip galvanizing process.

Stuart J. Swensson
secretary
American Hot Dip Galvanizers Association Inc.
Pittsburgh

We would like tear sheets of your article, "Humidity Cabinets Don't Tell the Whole Story" . . .

V. White
Prevention of Deterioration Center
National Research Council
Washington

• *Sent.—ED.*

True or False on Rates

We understand that scrap iron loaded in railroad gondola cars takes a 15 per cent reduction in freight rates if loaded in a minimum of 80,000 pounds.

Kindly advise whether this is true or false.

James Kane
Steel Warehouse Division
Kane Brothers
Millville, N. J.

• *True. A copy of the notice on this rate change has been sent.—ED.*

Queries on New Association

In reference to your article, "Take a Closer Look at Investment Casting" (Aug. 23, p. 104), who are the people who make up the institute, where are they and what do they do?

Raymond G. Baker
Engineering Department
Cross Co.
Detroit

Can you kindly send us the address of the Investment Casting Institute?

Robert J. Anderson
head, Department of Metallurgy
Southwest Research Institute
San Antonio, Tex.

• *The Investment Casting Institute is*

(Please turn to page 12)

This way you have better temperature control . . . and you save on fuel and maintenance

Cover lifter built by Lake Erie makes a big improvement in The TIMKEN Company's soaking pit operation

The soaking pit cover lifter illustrated is a new design built for The Timken Roller Bearing Company by the Lake Erie Engineering Corporation. It has many points of superiority over most other types of cover lifters. Obviously, it is a tremendous improvement over old-style covers that damage brickwork and do not provide a good seal because they have to be dragged across the top of the pit to open and close it.

The Timken Company is just one of the many nationally-known customers for LAKE ERIE'S specialized equipment and services. These companies — and industrial firms all over the world — have learned the advantages of doing business with LAKE ERIE which has one of the most competent engineering staffs and completely equipped plants in the heavy machinery field. Ask us to quote on your next requirements. LAKE ERIE'S Rolling Mill Auxiliary Equipment and Rebuild Services — famous in both ferrous and non-ferrous mills in Western New York for years — are now available throughout the United States.

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Oiling machines • Dryers • Upenders and downenders
Tension bridles • Shear gauges • Peelers and processors

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Coil build up lines • Sheet pickle lines • Sheet and strip shearing lines
Cleaning lines • Strip pickle lines • Resquare lines
Slitting lines • Annealing lines

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Bedford Cranes are individually engineered

In steel mills, power plants and throughout heavy industry, wherever superior performance is *expected*, experienced owners are enthusiastically recommending Bedford cranes.

Further proof of the superiority of Bedford cranes is found in the high percentage of *repeat orders* from important owners through the years.

Built to the most modern standards and backed by more than 52 years of specialized crane building *and utilization* experience... Bedford cranes have won fame the world over for advanced design and for safe, smooth, dependable performance.

Available in all types and sizes ... from 5 tons to 350 tons, and up, for all kinds of indoor and outdoor services... each Bedford crane is individually engineered and precision built for its specific application.

You are invited to consult a Bedford engineer on your next crane problem ... with all the facts on the table we believe you too will make your next crane a Bedford.

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BEDFORD

BEDFORD FOUNDRY & MACHINE COMPANY, INC. · BEDFORD, INDIANA

LETTERS

(Concluded from page 10)

a recently formed trade association of companies interested in the investment casting process. President of the group is K. M. Bartlett of Thompson Products Inc., Cleveland. Permanent address of the association is 27 E. Monroe St., Chicago 3. If you will write to the institute, it will be happy to give you details about its activities.—ED.

Turning Back Selling Costs

Your story, "Manufacturers' Agents Help Hold the Line in Selling Costs" (Aug. 30, p. 32), interests us. As a follow up in connection with our own sales problems, I wonder if you could give me the address of the Manufacturers' Agents National Association.

Your publication is gobbled up every week by a good many people here in our plant who have high praises for its content, presentation and authenticity.

W. C. Roberts
American Emblem Co. Inc.
Utica, N. Y.

• *The address you seek is: A. X. Schilling, executive secretary, Manufacturers' Agents National Association, 1724 W. Main St., Alhambra, Calif.—ED.*

. . . we are interested in obtaining further information from this association . . .

J. M. Crews
Central Steel Tube Co.
Clinton, Iowa

. . . we would like the address of the agents' association . . .

H. Roper
Acme Alloys Inc.
Philadelphia

. . . we are interested in obtaining copies of the agents' association's Standard Form of Agreement . . .

J. A. Gallagher
Herr Equipment Corp.
Warren, O.

• *For further information, write to the Manufacturers' Agents National Association at the address given above.—ED.*

Transported by Article

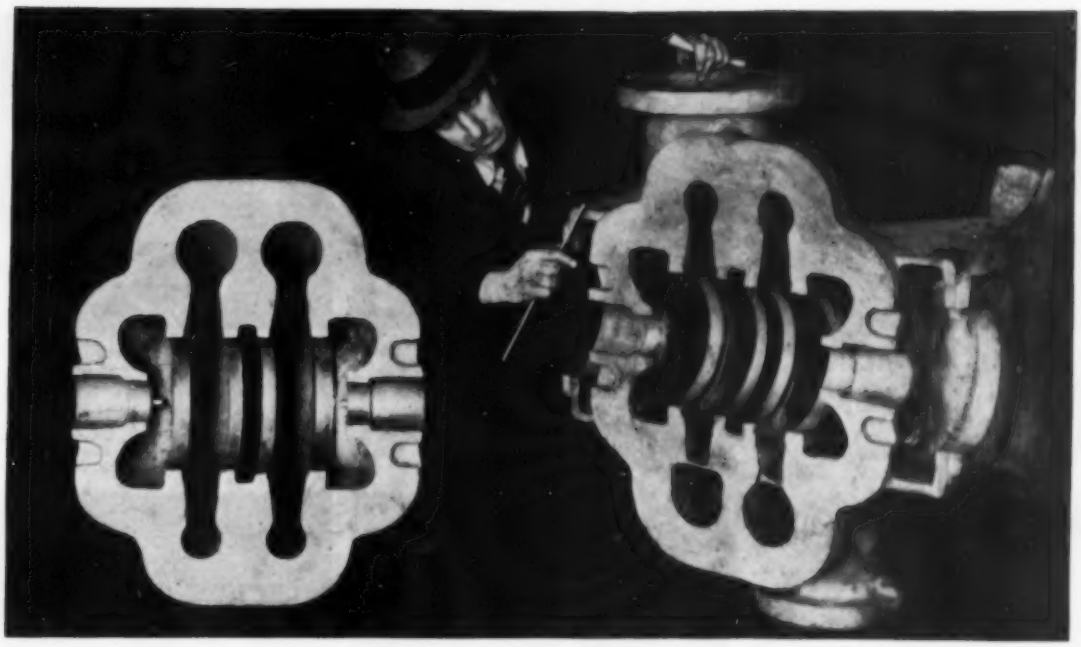
I have read with interest your article, "Transportation in Distribution," Number 7 in STEEL's 1954 Program for Management (Aug. 23, p. 89). Please send me ten copies.

Kenneth L. Vore
general traffic manager
Westinghouse Electric Corp.
Pittsburgh

. . . it would be most helpful to me and especially to my students if you would be kind enough to send me about 50 tear sheets of that article . . .

Frank L. Merwin
665 Jennie Court
Lafayette, Calif.

• *Sent.—ED.*



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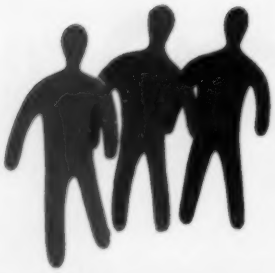
WAD 5065 **Warehouse stocks carried by all Ryerson Steel plants**

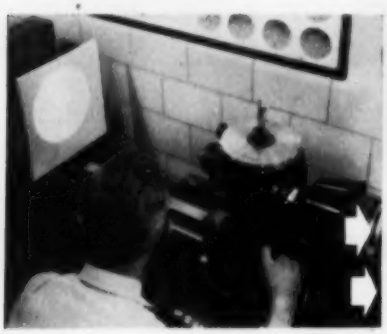


HERE'S WHAT HAPPENS WHEN REPUBLIC'S 3-D METALLURGICAL SERVICE GOES INTO ACTION

The field metallurgist comes right into your plant. He checks furnace temperatures and heating cycles, machines, set-ups, feeds, speeds, everything which affects your production.

He talks to your plant and engineering people, asks questions, finds out what you want your alloy steels to do. He takes this data with him.

The Republic Field Metallurgist talks over his report with Republic's Mill Metallurgist. Experienced in producing alloy steels, he adds his knowledge, checks it against your problem. And since Republic controls its alloy steels from ore to finished product, he can trace heats of steel.



The field metallurgist next talks things over with the Republic Laboratory Metallurgist. His data on tests of alloy steels is added to the material of the field and mill metallurgist.

Then, all three men put their heads together and come up with a recommendation that is the result of pooling their findings and their experience with alloy steels. And since Republic pioneered the manufacture of alloy steels, this recommendation is based on solid data.

The Republic Field Metallurgist passes this recommendation on to your engineers and plant personnel. He works with them to see that your problem is solved satisfactorily, right in your plant. It's his job to see that you get all the advantages out of the alloy steels you use.

The results often include lower production costs, better quality, or even changes in design. You can have this free service by calling your local Republic Steel sales office.

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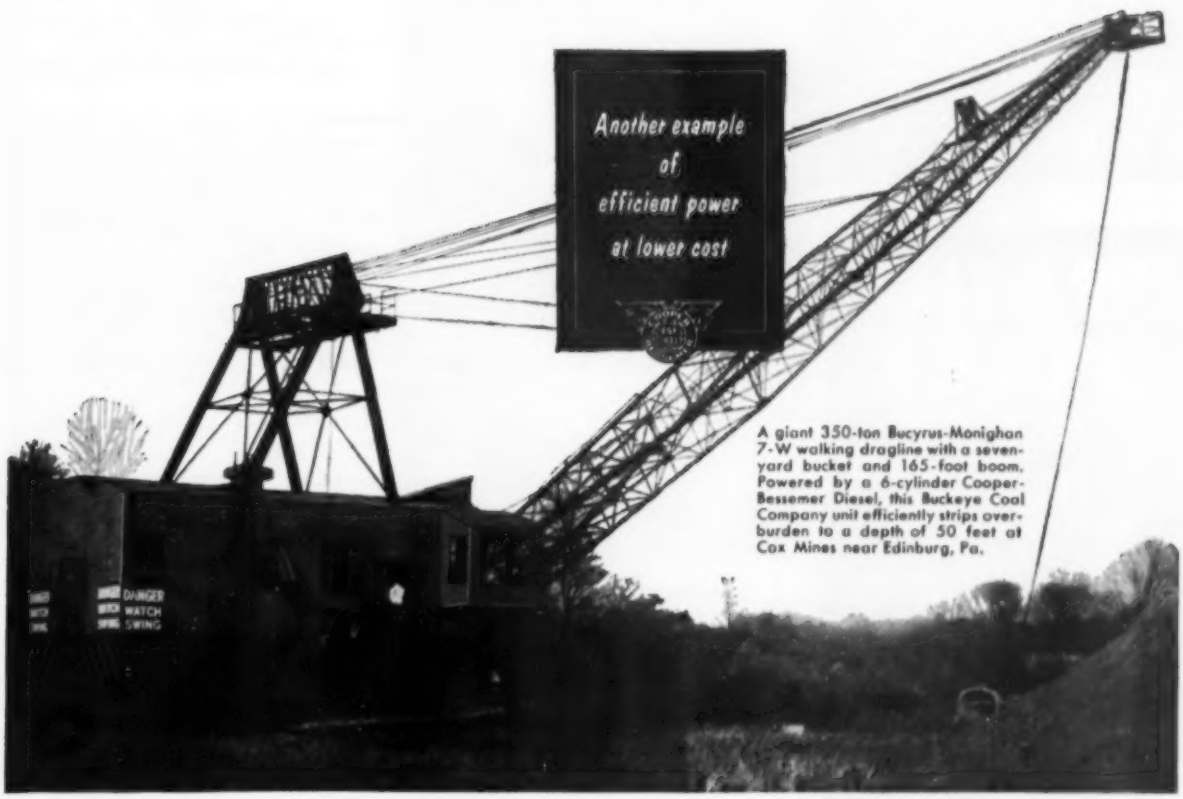
COOPER-BESSEMER GOOD AS EVER AFTER

10 years at hard labor

AFTER more than 10 years and 46,000 hours of heavy-duty strip mining, the Cooper-Bessemer Diesel powering this walking dragline continues to offer trouble-free operation in one of the most grueling types of engine service.

The "instant-response" power needed for digging as well as walking is supplied by a rugged six-cylinder Cooper-Bessemer Diesel. Yearly maintenance overhauls of the engine have shown surprisingly little wear to any major engine parts . . . an impressive record of stamina and low-cost service.

This engine's year-after-year dependability is additional proof that you can always rely on Cooper-Bessemers for exceptional life and continuing economy. For power requirements from 200 to 3700 bhp, see your nearest Cooper-Bessemer office for complete details.



A giant 350-ton Bucyrus-Monighan 7-W walking dragline with a seven-yard bucket and 165-foot boom. Powered by a 6-cylinder Cooper-Bessemer Diesel, this Buckeye Coal Company unit efficiently strips overburden to a depth of 50 feet at Cox Mines near Edinburg, Pa.

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GISHOLT

TIME-SAVING IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your own work.

SAVING TIME ON 6 TYPES—AND 24 SIZES

No. 24 Hydraulic Automatic Lathe with Hydraulic Tracer Unit Speeds Output of Bearing Races

Put new zip and lower costs into bearing race production with *six* different types and 24 varying sizes? And do the whole job on only *one* machine? Sounds like quite an order, doesn't it?

It's really a pushover with the No. 24 Hydraulic Automatic Lathe—equipped with the Gisholt Hydraulic Tracer Unit. This user shows how inner and outer bearing races requiring spherical, straight or tapered bores can be handled with speed and ease.

In the first operation, longitudinal movement of the front carriage and transverse movement of the standard slide permit tools to turn the O.D. up to the chuck jaws and face the forgings. The longitudinal movement of the rear carriage carries the tooling toward the spindle, and the template-controlled Hydraulic Tracer Unit actuates the rear slide, causing tools to rough-generate the spherical bore (for this typical 18" O.D. part) and break the corners at the end of the cut.

Tracer Unit Holds Fine Tolerances

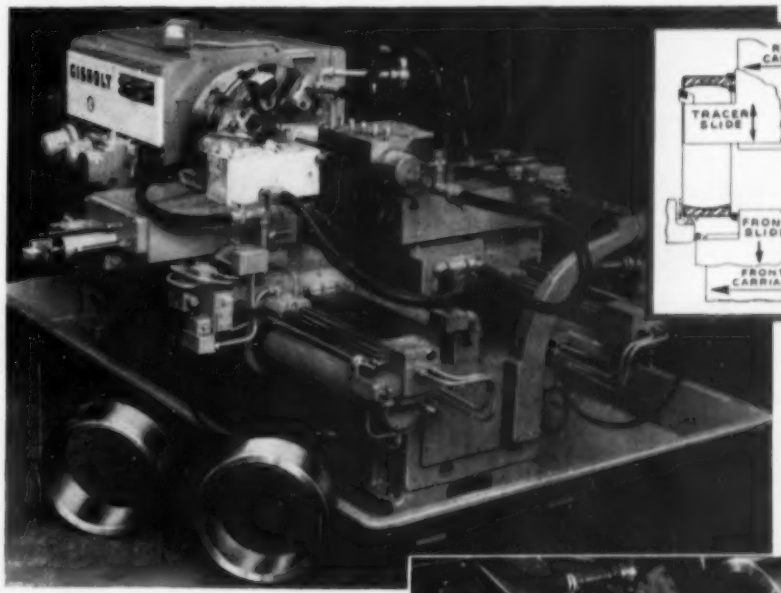
For the second operation the template is quickly re-located and the stops changed. Tools on the front slide finish turn the O.D. and face the other side. Tools on the tracer-controlled rear slide finish-generate the spherical bore, holding a .0005" tolerance, and then break the corners.

Each operation takes just 8 minutes f.t.f. with 90 lb. of tough bearing steel removed in less than 16 minutes total machining time. That's really knocking 'em out!

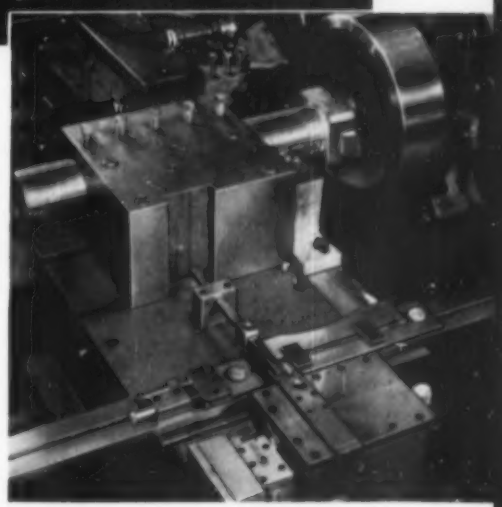
The Gisholt Hydraulic Tracer Unit operates at high pressure with slide movements controlled by a template and stylus-type follower. Square faces can be machined and cuts of ¾" depth at .035" feed are easily made. Setup is quick with convenient micrometer adjustment screws for accurate slide and template positioning.

The Hydraulic Tracer Unit is adaptable to other machines, too, for solving a wide variety of production problems. Your Gisholt representative can tell you about it and the No. 24 Hydraulic Automatic Lathe.

Quick changes for doing spherical, straight and tapered boring in a multitude of parts have one simple solution . . . the Gisholt Hydraulic Tracer Unit.



No. 24 Hydraulic Automatic Lathe set up for bearing race production.



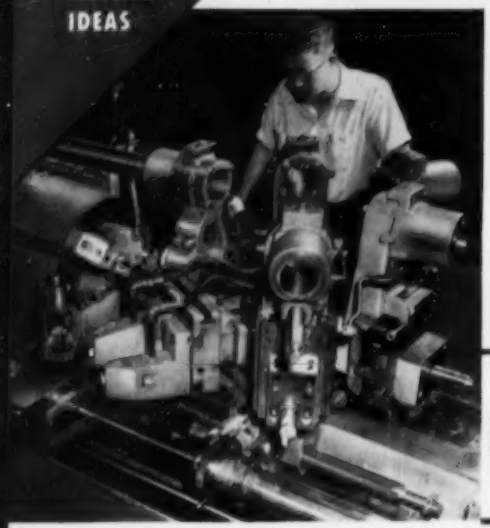
The hydraulic tracer controlled rear slide arrangement. Note the micrometer settings for positioning the template.

GISHOLT

TIME-SAVING IDEAS

HERE'S SOME TICKLISH INTERNAL BORING AND FORMING—*Done With Standard Slide Tools*

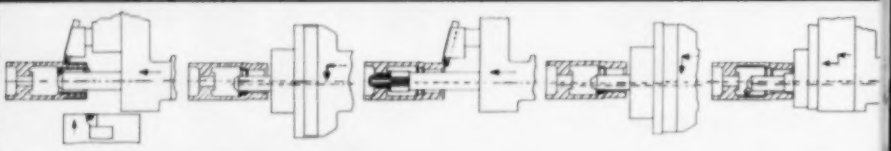
How the Gisholt Fastermatic Automatic Turret Lathe Reduces Time and Costs



The producers of these parts had the problem of going through an outer small diameter bore in order to get to a larger diameter bore inside. Ticklish as it sounds, they came up with "stock" tool answers to keep costs down.

The job's being done on a Gisholt 2F Fastermatic Automatic Turret Lathe with slide tools mounted on hexagon turret stations and operated by the standard back-facing attachment on the rear cross slide. After the tools have reached required depth through the small bore, the back-facing attachment actuates the slide which carries the tool the short distance necessary to complete internal machining operations. The workpieces—which are malleable iron valve castings—are machined in a floor-to-floor time of 4.2 minutes.

Here standard tools working in close quarters cut costs with internal boring and forming of castings completed in one fast, automatic cycle.



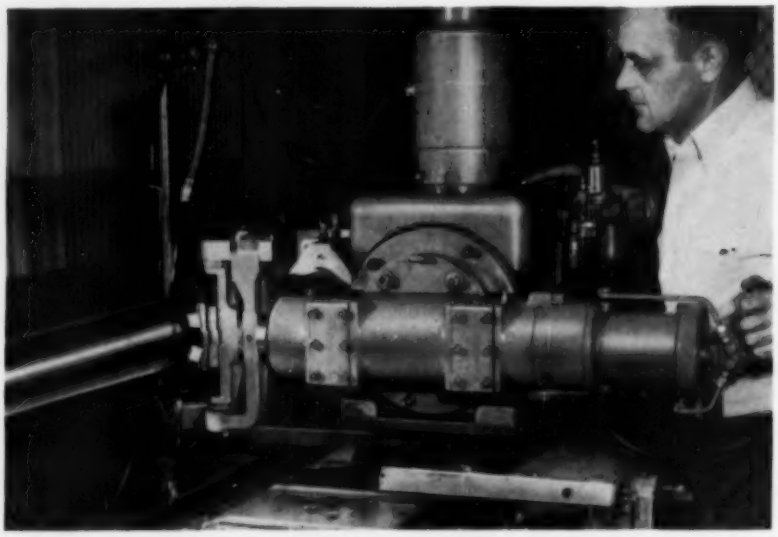
SAVES UP TO 3½ HOURS PER PART...INSURES BETTER CHROME PLATING BY SWITCH TO SUPERFINISH

Inexpensive Attachment for Turret Lathe

Long life and fine operation make it necessary that these forged steel piston rods for hydraulic presses be chrome plated. Production was slow and costly—penalized by a polishing operation which required four hours to complete.

A dramatic answer to this time problem was provided by Superfinishing. Now, the piston rods are turned on this Gisholt 3L Saddle Type Turret Lathe and Superfinished via an inexpensive attachment—right on the lathe. There is no polishing operation this way; only 30 minutes are needed to Superfinish. The saving in time: 3½ hours!

Not only is the geometry of the piston rod improved by Superfinishing, but the surface is also brought down to true base metal which permits excellent, hard chrome plating. In this case, the turned surface of approximately 150 micro-inches R.M.S. is refined to a 5 to 7 micro-inch surface finish.



Surface finish on the piston rod is improved by Superfinishing over the former polishing method.

This simple attachment on a Gisholt Turret Lathe reduced a four-hour polishing operation to a thirty-minute Superfinishing job. Costs are lower, results much better.

The new SUPERFINISHING CATALOG tells about this important process, shows many interesting jobs. Write for yours.

GISHOLT

TIME-SAVING IDEAS

NOTHING LIKE THE CROSS-FEEDING HEXAGON TURRET FOR JOBS LIKE THIS

Heavy Parts Simultaneously Machined at Both Ends

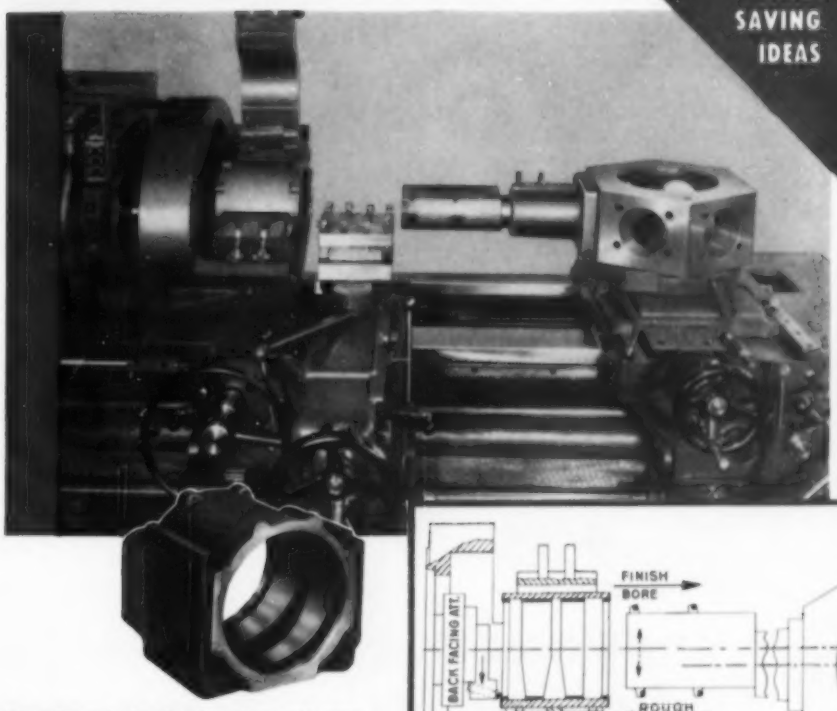
Not every lathe can make such a simple job of work like this: rough and finish boring . . . while simultaneously facing both ends of a part.

This Gisholt 4L Saddle Type Turret Lathe is doing it to these railroad bearing journal boxes. The cast steel workpieces are loaded by crane in the fixture.

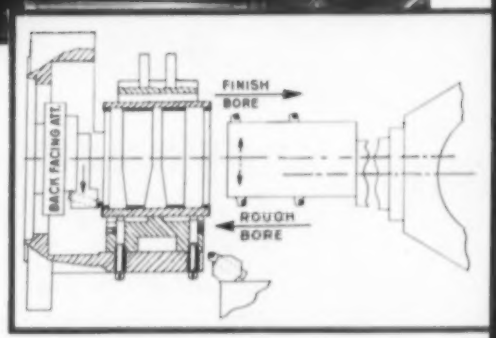
The cross-feeding hexagon turret carriage is equipped with solid positive stops on the front and rear which take care of sizing the bore for both the forward feed and reverse feed machining operations. Two tools are on both the front and back of the boring head, thus splitting up the cut.

For rough boring, the hexagon turret is brought forward to the front stop and then fed into the work. When boring is completed, the hexagon turret is moved back to the rear dead stop and fed outward for finish boring. A back facing attachment within the spindle faces one end, and the square turret tool faces the other end.

This unique tooling setup is used for machining 9 different sizes of workpieces with f.t.f. time ranging from 23 to 31 minutes.



When fixture is closed and machine starts, cross-feeding hexagon turret tools you see do rough boring. Tools on other side do finish bore on reverse feed.



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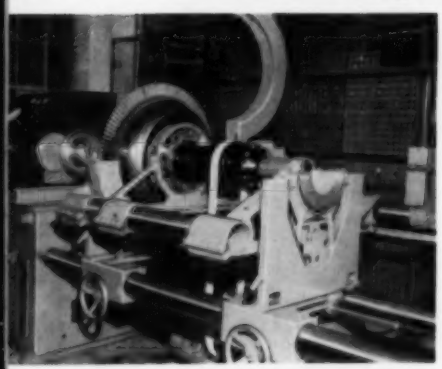
A SIMPLE SOLUTION TO SPECIAL BALANCING PROBLEM

Gisholt Balancing Machine Locates Dangerous Unbalance in Jet Engine Part



Jet engine turbine rotor assembly ready for precision balancing. Shroud is lowered over rotor during balancing operation.

Gisholt Balancing School—offers complete courses in theory and practical application of balancing to help with your particular problems. For complete details, starting dates, write today.

Unbalance causes vibration, and vibration means trouble. Bad trouble in the case of this jet engine turbine rotor assembly if it were allowed to remain. That's why precision balancing is such an important part of production.

A Gisholt DYNETRIC 3UJP Balancing Machine is used for dynamically balancing every assembly. Placed in a special cradle, the unit is rotated on its own bearings. Shrouding is provided to reduce air load.

Taking direct readings from the machine, the operator quickly corrects unbalance by adding steel weights in a balance-ring groove machined on the outside face of the turbine wheel for the left correction plane—and by adding washers to bolts for the right correction plane. The result is balance of unbelievably low tolerances, completely smooth operation.

Precision balancing can make your rotating parts and products better performing . . . and more lasting. Gisholt balancing equipment is adaptable for virtually every balancing problem.

Providing balancing correction facilities in the original design speeds up this vital balancing operation.

DYNETRIC BALANCERS GISHOLT

There is full information in the booklet, GISHOLT BALANCING MACHINES. Ask your Gisholt representative, or write direct for your copy.

GISHOLT

GISHOLT

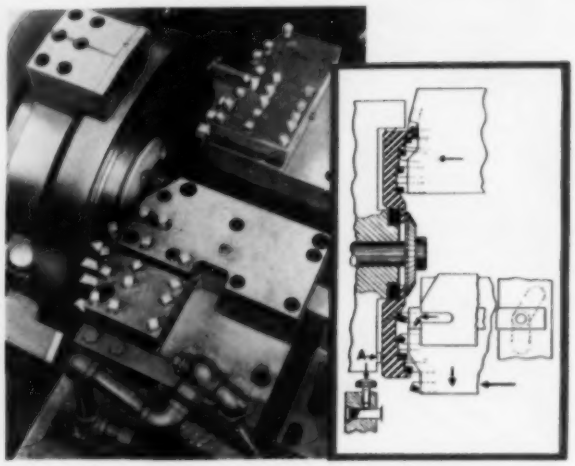
TIME-SAVING IDEAS

BUNCHING UP OF CUTS FINISHES LARGE PARTS FAST

Simplimatic Pulls 11 Tools at Once to Cut Costs!

These large steel flywheels require boring and facing on several diameters—plus special angle facing. The best approach to the problem was found in the Gisholt Simplimatic Automatic Lathe. This permitted combining all operations in one setup.

The 19″ flywheel is held by an air-operated drawback fixture. The job starts with tools on the front slide being table fed to cutting position. Normal slide movement then carries the tools away from the spindle centerline, finish facing three step faces and the rim face. The hub angle is finish faced with a tool held in a sliding tool holder mounted inside the main tool block and controlled by a special cam. Tools on the rear slide finish bore three co-bores, finish turn the hub and chamfer the rim O.D. and I.D. A total of eleven tools works simultaneously to finish this part in just 5.60 minutes f.t.f.



Tooling setup for machining flywheels. "A" shows spring jack for supporting edges of workpiece and preventing chance of distortion.

Close-up shows tooling arrangement on front and rear slides and sliding tool holder mounted inside the main tool block.

Straight and angular facing, plunging and facing, turning, boring and chamfering . . . all these cuts are taken simultaneously on the Simplimatic Automatic Lathe with speed that means minimum costs.

• • •

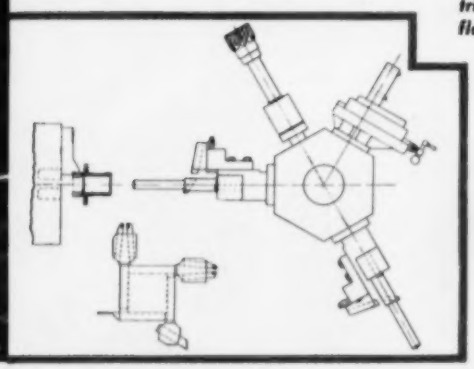
CHUCKING RING SAVES SECOND OPERATION

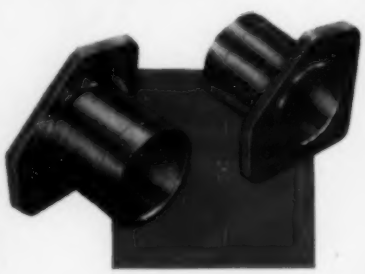
Gisholt Ram Type Turret Lathe Speeds Turning and Boring Work

Machining these bearing support bushings would normally be a two-operation job. But it isn't, because of the addition of a chucking ring to the casting. It's a case of the slight value of the cut-off stock being more than made up by savings in time and greater accuracy.

Tools on the hexagon turret bore, turn, face, ream and chamfer. At the same time, tools mounted in special double tool holders on the square turret rough and finish straddle-face the flange, form the O.D. relief and cut off to length. Time is only 3.5 minutes f.t.f.

By leaving a chucking ring on the workpiece, a second operation is eliminated, concentricity is assured as is parallel facing of flange. Saves machining time, too.





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GISHOLT

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

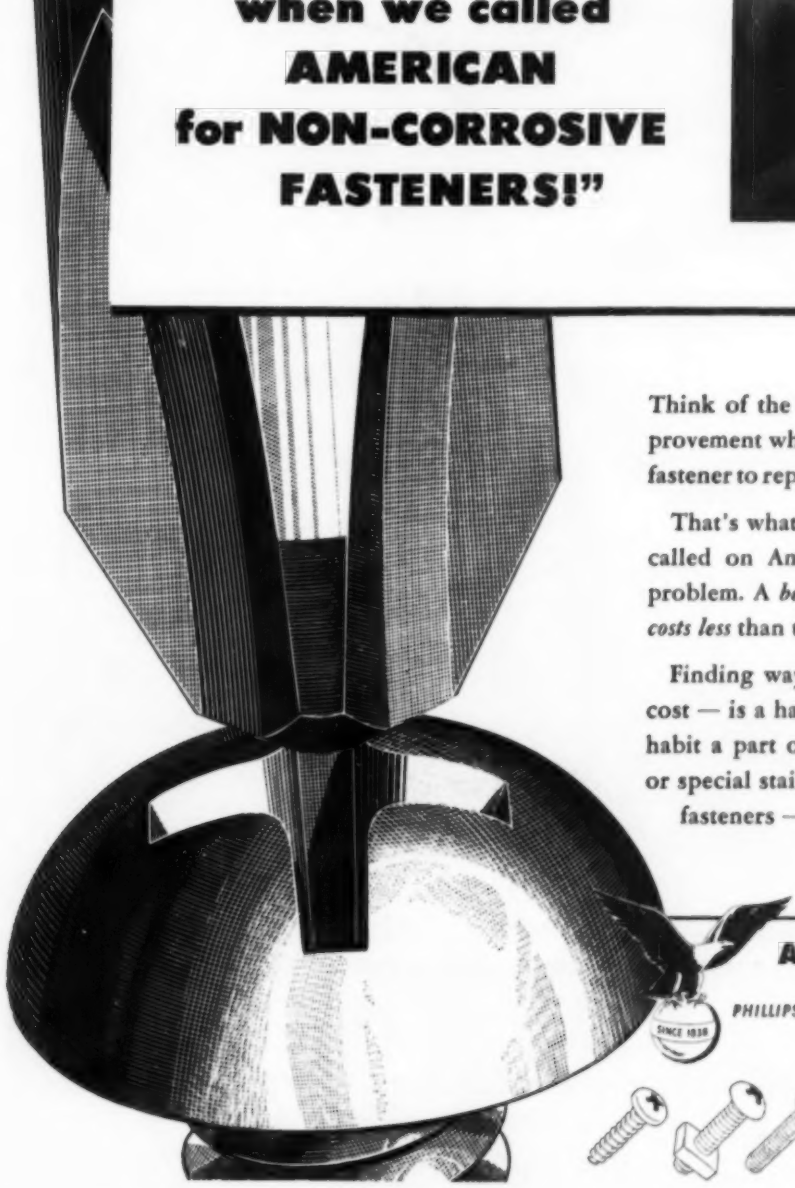
GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Now a one-piece, cold-headed non-corrosive fastener, this was once made from a machine screw, the head covered with brass and the brass crimped in place.

"A 3-part job became 1... when we called AMERICAN for NON-CORROSIVE FASTENERS!"



Think of the savings. Think of the product improvement when you get a one-piece cold-headed fastener to replace a unit made in three operations.

That's what happened here when the customer called on American for help with a fastening problem. A *better* fastener was developed, and it *costs less* than the one previously used.

Finding ways to fasten it better — and at less cost — is a habit here at American. To make our habit a part of your profit on standard Phillips or special stainless steel and other non-corrosive fasteners — get in touch with:

AMERICAN SCREW COMPANY

PHILLIPS HEADquarters — WILLIMANTIC, CONNECTICUT

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WASHBURN

CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

something new

in **BROACHING**

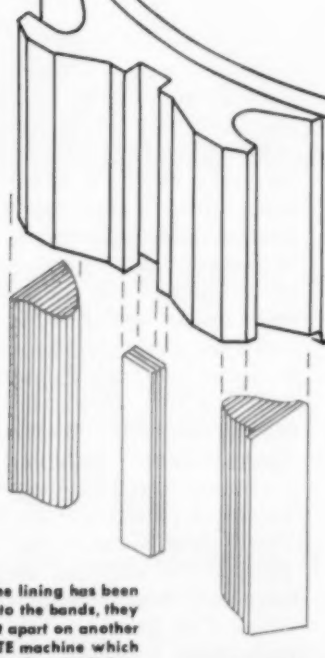
this **LAPOINTE**

10-Ton
54-inch Stroke

double ram VERTICAL BROACHING MACHINE

is designed to EXPAND TRANSMISSION BAND ASSEMBLIES

3/16" in circumference, to true size and diameter, while at the same time BROACHING the area shown in *green* . . . without removing parts.



After the lining has been bonded onto the bands, they are cut apart on another LAPOINTE machine which also chamfers the lining.

PRODUCTION RATE IS 450 PARTS PER HOUR at 80% efficiency, removing .380" depth of stock on a surface. Fully push-button controlled — the operator needs only to load and unload the parts!

You can always keep up with the newest in broaching techniques, when you call on LAPOINTE! That's to be expected, because we've been engineering and building *broaching machines, tools and fixtures* for more than 52 years.

If you want more information about the job described above, write for Bulletin TBA-DRV-3

THE **LAPOINTE** MACHINE TOOL COMPANY

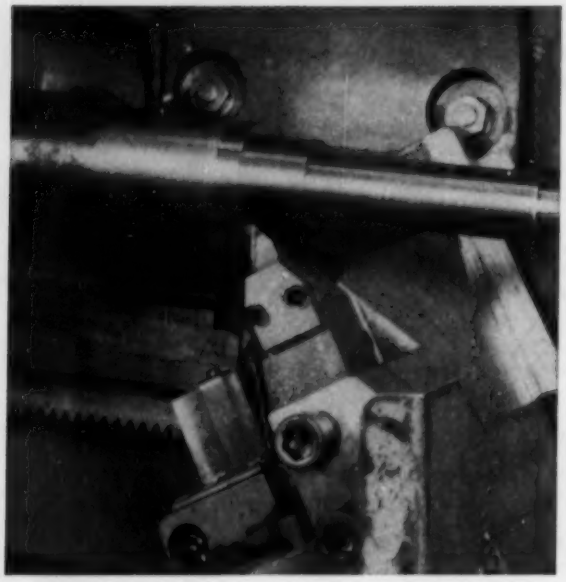
HUDSON, MASSACHUSETTS • U. S. A.

In England: Watford, Hertfordshire

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

(Advertisement)

. . . a performance report on another Kennametal grade with ideas you can use to cut machining costs



New Kennametal profiling tool, with clamped K4H grade insert, machining pinion gear blank on New Britain +GF+ Copying Lathe. The Lathe's hydraulic system operates the copying slide and actuates several automatic functions.

100% increase in surface speed on New Britain +GF+ Copying Lathe with new Kennametal* K4H Profiling Tool

A series of tests were run to determine which tooling would best utilize the performance potential of this New Britain +GF+ Copying Lathe in profiling SAE 8720 steel pinion gear blanks.

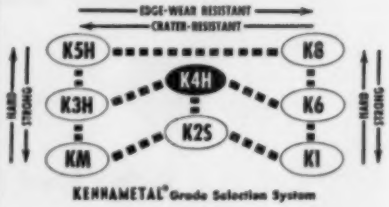
With K4H inserts clamped in new Kennametal PT Style Tools, these tough pinion forgings were profiled at 850 RPM. The machining time averaged 32 seconds, holding plus or minus 0.001 inch on all diameters. The depth of cut on each side was ⅜ inch. An average of 220 pieces were machined per grind.

Prior to testing K4H inserts, the maximum lathe speed practical with standard brazed carbide tools was 425 RPM.

The 100 percent increase in surface speed made possible by the use of K4H inserts permitted fuller utilization of the capabilities of this new, versatile, high speed lathe. A20

*Registered Trademark

K4H is a hard grade with unusually high strength which makes it suitable for roughing scaly, abrasive steel castings and forgings where both edge-wear and crater resistance are required. Versatile K4H is also an excellent grade for interrupted cutting and, when used as a brazed tool, for a variety of finishing operations where the chip load is light.

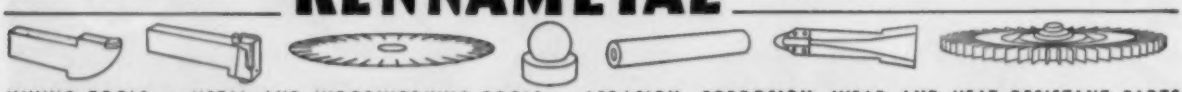


KENNAMETAL® Grade Selection System

The easy-to-use grade selection guide shows that K4H is harder than K2S—more crater resistant than K6—more edge-wear resistant than K3H. It is an intermediate grade having a wide range of application. Where greater edge-wear or crater resistance is desired, performance can be improved simply by changing to the grade indicated on the guide.

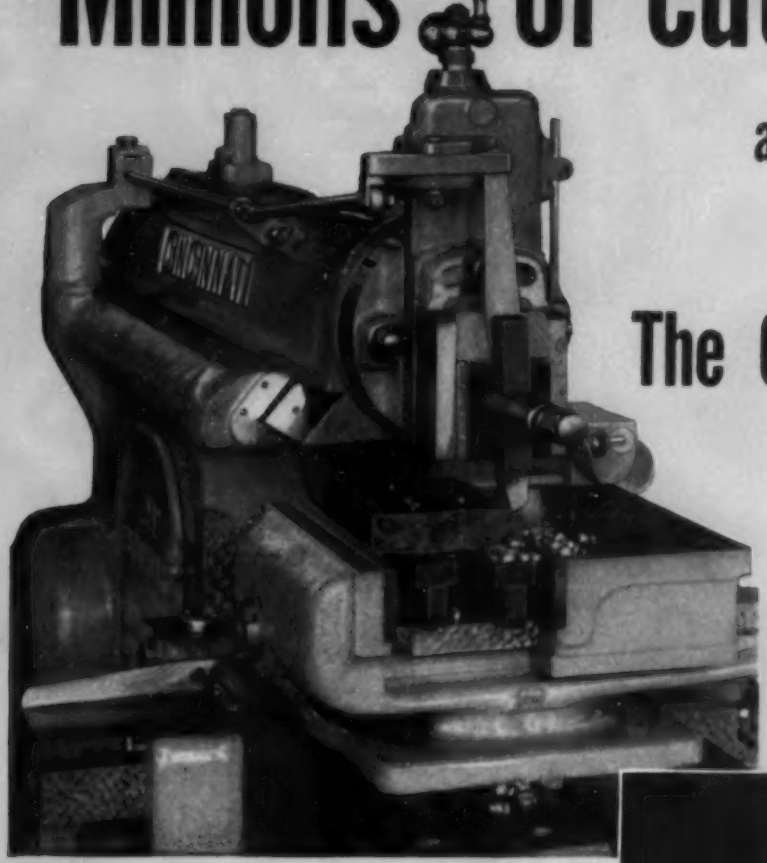
Across the country, over 150 Kennametal Tool Engineers are helping plants solve their machining problems by analyzing tool wear—helping select the tool or grade best suited for the job—conducting in-plant training programs. You'll find Kennametal Offices listed in the classified sections of telephone directories in principal cities. Call your nearest Kennametal Tool Engineer, or write to KENNAMETAL INC., Latrobe, Pa.

INDUSTRY AND **KENNAMETAL** . . . PARTNERS IN PROGRESS

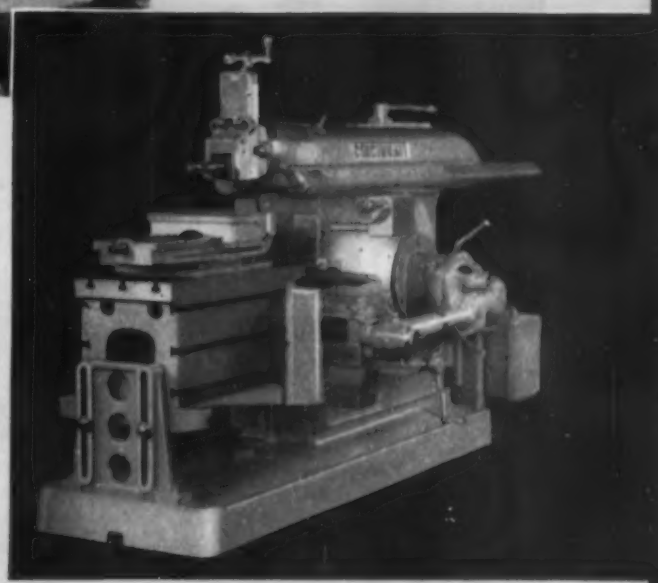


MINING TOOLS • METAL AND WOODWORKING TOOLS • ABRASION, CORROSION, WEAR AND HEAT RESISTANT PARTS

Millions of cuts without a fault...



The CINCINNATI Tool Lifter!



The dependable Cincinnati Tool lifter, with positive return and lift, eliminates tool damage—operates at high speeds—and with angular settings of tool slide or clapper box. Protects and permits use to maximum advantage of carbide or high speed cutting tools.

After simple setting it is automatic, relieves operator and increases production.

Write for Shaper Catalog N-6.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Strategy ...FOR QUALITY

BULLARD

Top Quality in your product demands that interchangeable parts be fabricated to the highest degree of accuracy. To obtain such necessary tolerances requires the selection of machines recognized as meeting such high standards. The Bullard Spacer, without the high cost of jigs or fixtures, gives the San Diego Division of Convair, on drilling and counterboring, tolerances up to +.0015 and —.0000, and distance between hole centers within ±.005. On other installations also, with precision drill spindles, The Bullard Spacer holds consistently to ±.001 or better.

Let a Bullard Representative analyze what this machine can do on your work or write to

THE BULLARD COMPANY - BRIDGEPORT 2, CONN. Tel. EDison 6-2511

CALENDAR
OF MEETINGS

September 27-28, Steel Founders' Society of America: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Society address: 920 Midland Bldg., Cleveland 15. Executive vice president: F. Kermit Donaldson.

September 27-29, American Management Association: Fall personnel conference, Hotel Astor, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

September 27-30, Society of Industrial Packaging & Materials Handling Engineers: Annual exposition, competition and short course, Coliseum, Chicago. Society address: 111 W. Jackson Blvd., Chicago. Managing director: Charles J. Carney Jr.

September 28-October 1, Association of Iron & Steel Engineers: Annual convention and biennial exposition, Public Auditorium, Cleveland. Association address: 1010 Empire Bldg., Pittsburgh 22. Managing director: T. J. Ess.

September 29-October 1, Porcelain Enamel Institute Inc.: Annual meeting, Greenbrier hotel, White Sulphur Springs, W. Va. Institute address: 1346 Connecticut Ave. N.W., Washington 6. Secretary: John C. Oliver.

October 1-2, Standards Engineers Society: Annual meeting, Haddon Hall, Atlantic City, N. J. Society address: P. O. Box 281, Camden 1, N. J. Secretary: Harold J. Nugent.

October 3-5, National Association of Sheet Metal Distributors: Annual meeting, Marlborough-Blenheim hotel, Atlantic City, N. J. Association address: 1900 Arch St., Philadelphia 3. Secretary: Thomas A. Fernley Jr.

October 3-6, American Hardware Manufacturers Association: Annual meeting, Marlborough-Blenheim hotel, Atlantic City, N. J. Association address: 342 Madison Ave., New York 17. Secretary: Arthur L. Faubel.

October 3-7, Electrochemical Society Inc.: Fall meeting, Hotel Statler, Boston. Society address: 216 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

October 4-6, National Electronics Conference: Annual meeting and exhibit, Hotel Sherman, Chicago. Conference address: 84 E. Randolph St., Chicago 1. Executive secretary: John S. Powers.

October 5-7, American Institute of Electrical Engineers: Middle Eastern district meeting, Abraham Lincoln hotel, Reading, Pa. Institute address: 33 W. 39th St., New York 18. Secretary: N. B. Hibshman.

October 5-9, Society of Automotive Engineers Inc.: National aeronautic meeting, production forum and aircraft engineering display, Hotel Statler, Los Angeles. Society address: 39 W. 39th St., New York 18. Secretary: John A. C. Warner.

October 6, American Iron & Steel Institute: Regional closed technical meeting, Warwick hotel, Philadelphia. Institute address: 350 Fifth Ave., New York 1. Secretary: George S. Rose.

October 6-8, National Foundry Association: Annual meeting, Hotel Sheraton, Chicago. Association address: 53 W. Jackson Blvd., Chicago. Executive secretary: Charles T. Sheehan.

October 10-13, National Automatic Merchandising Association: Annual meeting and exhibit, Armory, Washington. Association address: 7 S. Dearborn St., Chicago. Executive director: C. S. Darling.

October 10-13, Controllers Institute of America: Annual national conference, Edgewater Beach hotel, Chicago. Institute address: 1 E. 42nd St., New York 17. Managing director: Walter Mitchell Jr.

October 11-13, American Management Association: Fall manufacturing conference, Plaza hotel, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

October 12-14, American Gas Association: Annual meeting, Municipal Auditorium, Atlantic City, N. J. Association address: 420 Lexington Ave., New York 17. Secretary: Kurwin R. Boyes.

when the job is tough . . .

USE "HARD-DUR" GEARS

they preserve the tooth form

• "HARD-DUR" Gears not only preserve tooth form because the material is highly wear resistant and the gears are scientifically heat treated to obtain maximum physical properties...but they have involute teeth that are produced to high standards of accuracy by very careful workmanship. In fact "HARD-DUR" Gears are so much stronger, harder and more wear-resistant, that they are guaranteed to have at least four or five times the life of similar untreated gears...and at only 50% extra in cost.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
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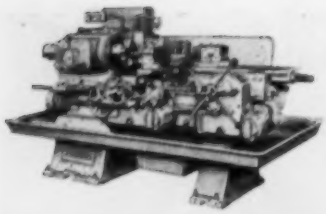
Send note on Company Letterhead for 488-Page Catalog 49



A NEW 3-WAY MARKETING SERVICE THAT HELPS YOU ACQUIRE NEW MACHINE TOOLS

Jones & Lamson's new 3-Way Marketing Service permits you to see ahead . . . and plan ahead . . . without sticking your neck out. This new service offers you a choice of 3 sound methods by which you can obtain new machine tools on terms best suited to your own individual requirements. The three methods: outright purchase; "pay-from-productivity" on a 1-to-5 year basis, at interest rates as low as 3¼%*; or any of 4 variations of a truly flexible lease plan.

JONES & LAMSON MACHINE CO.
517 Clinton St., Springfield, Vermont, U.S.A.

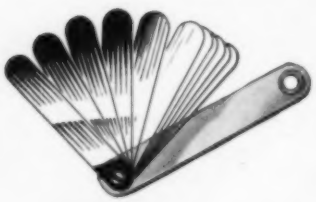
UNIVERSAL TURRET LATHES • FAY AUTOMATIC LATHES • AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES
AUTOMATIC THREAD & FORM GRINDERS • OPTICAL COMPARATORS • AUTOMATIC OPENING THREADING DIES & CHASERS

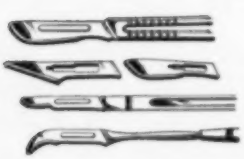
Applications engineered

with

NATIONAL-STANDARD

Wire and High Carbon Strip

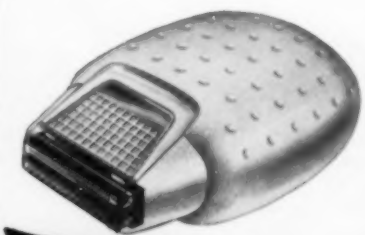


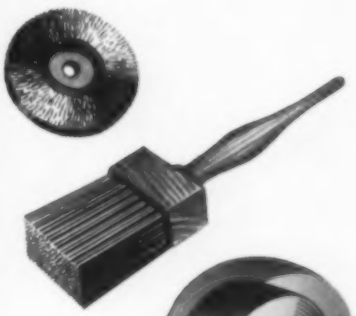


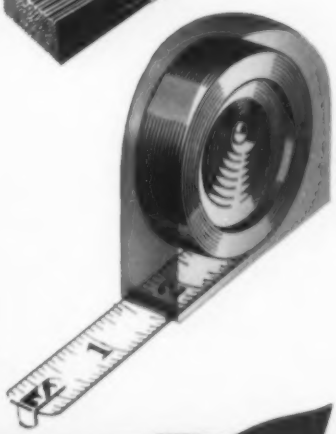
● The many and varied applications of National-Standard special-purpose steel are practically unlimited. Every day, new products and new manufacturing methods are developed that more than ever demand the precise control, high quality and uniformity that only National-Standard specialization offers.

Here we produce steel, wire and strip, to meet unusually severe specifications and are constantly developing special types for new uses. Glad to cooperate with you in best meeting your needs, National-Standard offers an enviable 48-year record of supplying outstanding material, workmanship and service to end-use manufacturers.

For additional information or engineering assistance, write to the appropriate National-Standard Division listed below.







DIVISIONS OF
NATIONAL-STANDARD

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

NILES, MICHIGAN

WEAN COMBINATION SLITTING AND SHEARING LINE REDUCES PRODUCTION COSTS FOR LYON METAL PRODUCTS

J. B. O'Connor

"We've noted savings made in raw material inventory; greater flexibility of inventory and improved service in our fabricating departments..."

To combat rising costs and meet increasing competition leading manufacturers in every field are giving modern production machinery a thorough going over.

Such was the case at Lyon Metal Products, Aurora, Illinois and York, Pa., one of the nations leading producers of sheet steel products. Months ago Lyon officials began to position themselves for the competition they knew to be inevitable. They reviewed their entire operation — studied every possible means of increasing production while curbing costs.

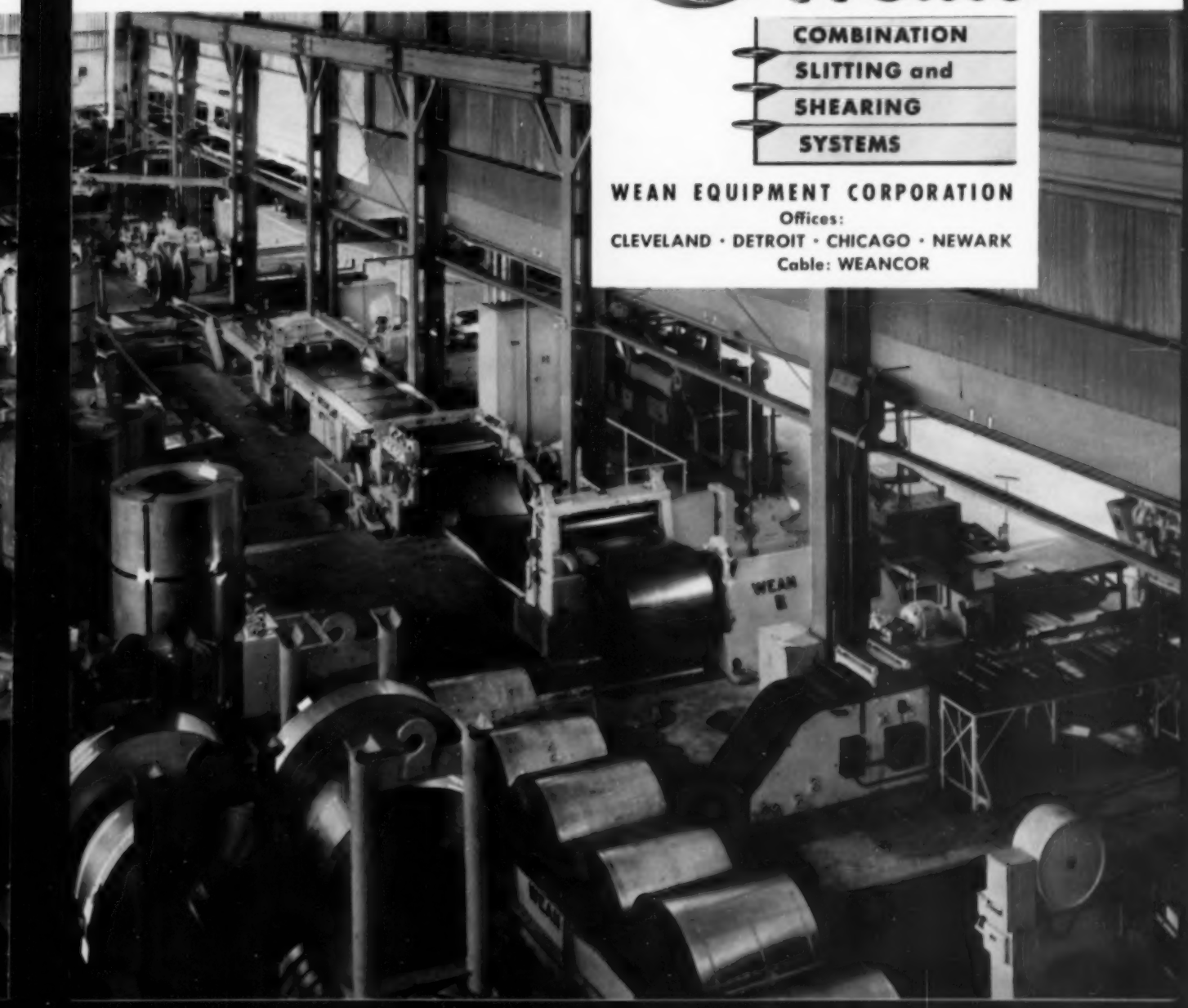
Photos by Hedrich-Blessing, Chicago

That's where Wean Equipment came into the picture. Wean knew their high production Slitting and Shearing Line was a natural for people like Lyon. They showed Lyon the sizable savings possible by buying coil stock directly from the mill, slitting and shearing to width and length desired. Lyon officials checked other Wean lines at work, cutting to resquared tolerances at 100 cuts or 200 feet-per-minute. Wean Equipment engineers pointed out the fact the users of this equipment required less warehousing, less stock control, that users paid less for their steel, had greater flexibility of their entire operation.

Lyon officials listened, compared figures, checked their costs and gave Wean the green light. Recently J. B. O'Connor, an official of Lyon Metal Products checked over the first three months Wean operation. He made the statement:

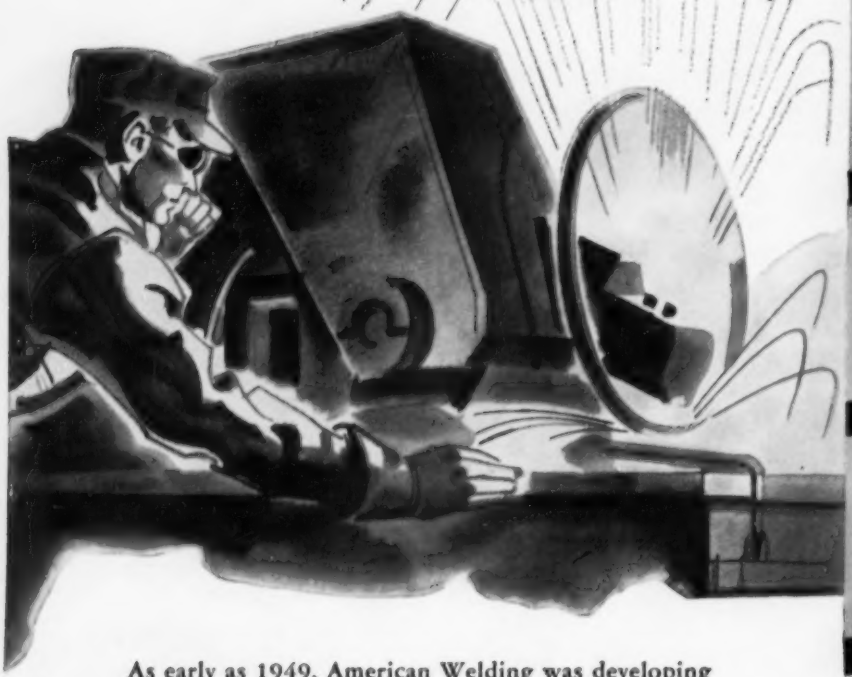
"We made a sizable saving in floor space, we accomplished a very much worthwhile reduction in our raw material inventory; we have much greater flexibility in that raw material inventory and perhaps more important, we are giving all of our fabricating departments a much improved service. We have every reason to believe that this will amortize itself in relation to expected returns on money invested."

If you're in the business of manufacturing products requiring various widths and lengths of steel, like Lyon, it will pay you to talk with Wean Equipment — once you get the entire story we're sure you'll agree the savings possible, even for smaller users, make the Wean Line one of the best investments in modern metal working equipment.



TITANIUM RINGS

an American Welding Specialty



As early as 1949, American Welding was developing production techniques for flash butt-welding of Titanium. Today it produces Titanium rings in addition to a host of other welded components for U. S. airframe and engine manufacturers.

If working Titanium or any of these metals present a manufacturing "headache" in your plant, call or write. Our Product Development Division will be glad to work with you.

AMERICAN WELDING

WELDING...MACHINING...FABRICATING

THE AMERICAN WELDING & MANUFACTURING COMPANY – 110 DIETZ ROAD, WARREN, OHIO

STEELS
All carbon and alloy constructional grades up to 1.00 carbon, including such typical analyses as ingot iron, 4130, 4340, and 52100. Also special alloys such as Timken 16-25-6, 17-22AS, 19-9DL, 19-9DX.
STAINLESS
Iron base, heat-resistant alloys such as chromium and nickel chromium steels.
NICKEL
Nickel base alloys, such as Monel* and Inconel*.
ALUMINUM
Weldable aluminum alloys.
COBALT
Cobalt base alloys such as N-155.
Send for free catalog of Production Facilities. Learn what American Welding is equipped to do for you.
* Registered Trademark International Nickel Company
AW

STEEL

September 27, 1954

Metalworking Outlook

Construction Boom To Continue

Building activity will continue at its present record volume for at least the next six months. That's the consensus of the Associated General Contractors of America, based on a national survey just completed. Contractors see stable conditions prevailing in materials, prices and wages, but expect keener competition among contractors. Estimated total expenditures for 1954 construction: $36 billion, an all-time high.

Saugus Byplay

New England still wants an integrated steel plant, but isn't likely to get it from U.S. Steel. Massachusetts Senator Saltonstall declared the region's continuing interest in a new mill at the ceremonies dedicating the Saugus Ironworks restoration. Big Steel's Fairless parried by suggesting New England's best chances for growth are in metal fabricating. Fairless Works of U.S. Steel now is supplying part of American Steel & Wire billet requirements at Worcester.

Arms Orders Going Up

Military procurement for fiscal 1955 will be between $16 billion and $18 billion, up from $9 billion in fiscal 1954, but little more than half that for the preceding three years. The Pentagon estimate is based on the assumption there is no major upward revision in the size of the military force.

New California Steel Mill Talked

Proposal for an electric furnace mill for production of pipe, tubing, conduit and tin plate in northern California is being considered by Mt. Shasta Steel & Tube Co. Shasta's president is G. I. Dumond, who once talked of a $136-million integrated Yolo Steel & Metal Co. at Sacramento. The company has been test drilling for iron ore near Shasta Lake in Shasta county and claims ore in sufficient quantity and quality to support an integrated plant.

GM Expands in Britain

General Motors will spend more than $100 million to expand Vauxhall Motors, its British subsidiary. Vauxhall now is exporting 57 per cent of its output of 130,000 cars and trucks. The expansion program will permit doubling its exports. Plans call for a modern press shop and related facilities and will provide Vauxhall with latest models of machine tools and other equipment.

Exports on the Upgrade

Rising exports are brightening the United States business picture. Second-quarter shipments of American goods to foreign countries climbed to

Technical Outlook—p. 83 Market Outlook—p. 121

Metalworking Outlook

$4.7 billion, an increase of $762 million over the preceding quarter and $354 million higher than the second quarter of 1953. For many industries increased exports provided a substantial offset to reduced domestic sales. Leaders in the gain: Autos, trucks, steel products, chemicals and nonferrous metals.

Consumer Purchases Rise

Business isn't too bad, judging from activity at a small midwestern company that lends money to finance consumer purchases of appliances and furniture. Each month since early last spring the loan agency has seen its business rise. "If business increases any more we'll be out of money," quotes the manager. He attributes the rise in business largely to restored confidence among consumers.

New Look at Inventories

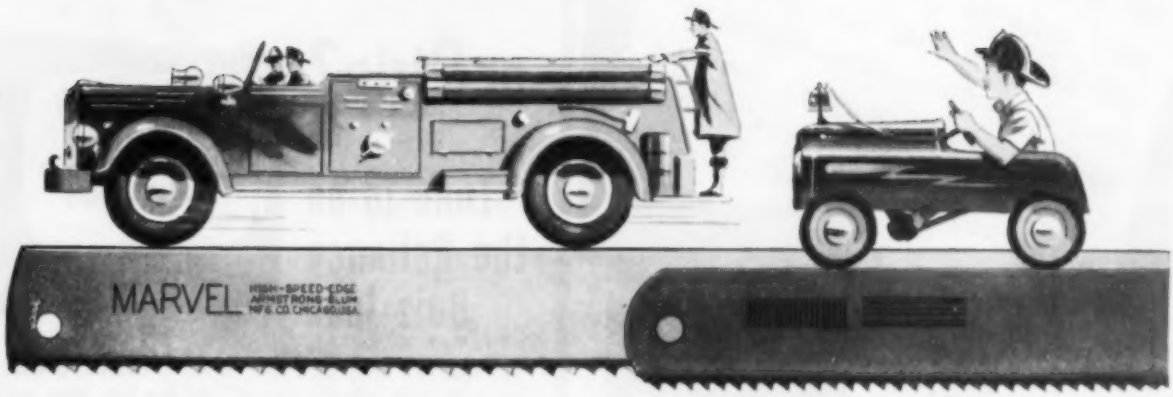
How large were steel inventories? When will their liquidation end? Those questions have a lot of people guessing. If you know the answers, you can pinpoint an upturn in steel demand and production. Inventories have been bigger and it has taken longer to reduce them than anyone thought. First it was believed surplus inventories were around 5 million tons of finished steel. Now it looks like they were twice that.

Straws in the Wind

Some oil companies, long concerned over the heavy taxes on gasoline, are adding a bright red stamp on their stationery: "Why not call it taxoline?" . . . Manila will get a modest $5-million steel plant to produce steel bars and construction materials. The plant will use Japanese equipment . . . A group of New England electric companies has formed the Yankee Atomic Electric Co. and hopes to make arrangements with AEC to build an experimental nuclear power plant. President is William Webster, executive vice president of the New England Electric System, Boston . . . James F. Brownlee, partner in J. H. Whitney & Co., and long active in various government units, heads a task force to prepare study materials for the cabinet committee on the development of energy supplies and resources policies . . . Studebaker, whose workers recently voted to accept a wage reduction, is cutting prices on 1955 models in a bid for larger share of market.

This Week in Metalworking

Automotive model changeovers, now starting, will give metalworking a fillip (p. 41) . . . United Steelworkers of America is emerging from its Atlantic City convention as a more mature union (p. 45) . . . Electro Metallurgical (p. 47) will produce at least 7500 tons of titanium annually at Ashtabula, O. . . . German task force in America to study marketing methods (p. 48) will pay its own expenses . . . Budgets can be a real working tool for middle management (p. 52) for planning and co-ordinating operations.



. . . *but*
Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate — without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!

MARVEL *Metal Cutting* SAWS

Better Machines–Better Blades

ARMSTRONG-BLUM MFG. CO. · 5700 Bloomingdale Ave. · Chicago 39, U. S. A.

"Wire users have told me they like to do business with DSC because they can talk over a problem directly with our operating people. Cuts through red tape. Gets things straightened out fast,"

Says

UNO JOHNSON

—Superintendent of our Portsmouth Division Rod and Wire Mill.

Whether a problem of yours concerns wire, or sheet or strip steel, you can talk right to the men in charge of making it at DSC. Your nearest DSC Customer Representative will gladly arrange it any time you so desire. You won't obligate yourself the least bit.

YOUR GUIDE TO DSC MILL PRODUCTS

Hot Rolled and Cold Rolled Sheet and Strip
Low and Medium Carbon Manufacturers' Wire
High Carbon Specialty Wire
Aluminum Cable Strand Reinforcement
Rope Wire Tire Bead Wire Welded Fabric

produced at
PORTSMOUTH DIVISION, NEW BOSTON, OHIO

●

Cold Rolled Carbon Steel Strip
Cold Rolled Carbon Spring Steel

produced at
DETROIT MILL DIVISION, DETROIT, MICHIGAN
EASTERN MILL DIVISION, HAMDEN, CONN.

For Helpful Action Contact Our General Office or Your Nearest DSC Customer Representative

DETROIT STEEL CORPORATION

GENERAL OFFICE — DETROIT 9, MICHIGAN

SALES OFFICES: Chicago, Cincinnati, Columbus, O., Dayton, O., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, Richmond, Va., St. Louis, Toledo, Worcester, Mass.

Use Warehouse Sheet or Strip?

Tune in on the Reliance Quiz Idea

We learned long ago that when it comes to sheet or strip steel, what's "meat" for one job, may well be "poison" for another. You just can't take anything for granted.

That's why Reliance sales people—on the telephone or at your desk—are apt to ask you a lot of questions to "spot" your job. That's so we can select and process in-stock steel best suited to your fabricating and economic needs.

"What's Your Job?" played the Reliance way is a sales-service tool, not a guessing game. It's part of the Reliance *JOB-FITTING* Idea—"Knowing our stuff . . . knowing your job . . . matching in-stock steel to your purpose."

May we show you how it works?

For Helpful Action
Call Our Nearest Plant or Office

RELIANCE STEEL DIVISION

DETROIT STEEL CORPORATION

PROCESSING AND DISTRIBUTING PLANTS

CLEVELAND PLANT, CLEVELAND 27, O., VUlcan 3-3600
DETROIT PLANT, DETROIT 28, MICH., WEbster 3-5866
EASTERN PLANT, HAMDEN, CONN., STate 7-5781
MIDWEST PLANT, CHICAGO 8, ILL., CAnal 6-2442

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More Own Homes

Last week, in observing National Home Week, the building industry emphasized that 55 per cent of American families own their homes. This significant statistic is worthy of further exploration.

Fortunately, the Census Bureau's figures on the tenure of occupied dwelling units are available by decades back to 1890. In that year there were 12,690,152 dwelling units, 47.8 per cent of which were owner-occupied and 52.2 per cent were tenant-occupied. The percentages fluctuated within narrow limits for 1900, 1910, 1920 and 1930, until in 1940, of the 34,854,532 dwelling units, only 43.6 per cent were owner-occupied and 56.4 per cent were tenant-occupied.

This means that, percentagewise, home ownership in 1940 was at its lowest ebb in 50 years. Nearly 9 per cent fewer families owned their homes in 1940 than in 1890.

But note what happened between 1940 and 1950! The number of dwelling units increased from 34,854,532 to 42,826,281—a gain of 7,971,749. Owner-occupied units rose from 15,195,763 to 23,559,966—an amazing gain of 8,364,203. Tenant-occupied units decreased from 19,658,764 to 19,266,315—a drop of 392,449. Thus 55 per cent of the dwelling units in 1950 were owner-occupied.

This sharp movement toward home ownership has occurred chiefly in the few years since the end of World War II. Should it continue and become a definite characteristic of American life, it would have tremendous economic significance on the future of our nation.

It would mean that young people will be taking title to property in their late twenties or early thirties. In so doing, they will be owning, and they and their children will be living in far better homes than their parents acquired at a much later stage in life.

With home ownership comes a new appreciation of the benefits of the free enterprise system and fresh doubts concerning socialism and communism.

Beyond this is the great incentive that a vigorous trend toward home ownership will impart to the metalworking industry to provide greater values for every dollar invested in a home.

E. C. Shaner

EDITOR-IN-CHIEF

VERSATILE TIN PLATE: It looks as if production of tin plate in the United States in 1954 will reach a new high point. In view of the fact that this year the output of most finished steel products will be from 25 to 30 per cent lower than in 1953 (p. 135), the record of tin plate is remarkable.

There are several reasons for this. Ever

since the nineties when President McKinley gave the infant domestic tin plate industry a helping hand by introducing a protective tariff, it has improved its position steadily. Better methods of manufacture have made for higher quality of product. The shift to electrolytic tinning has conserved precious tin to a marked degree. In turn, these improvements in product have led to new and broader uses for tin plate, particularly in the field of packaging. In fact, one of the principal factors in the present extraordinary demand for tin plate is the popularity of beverages dispensed in disposable tin cans.

Further research in retail merchandising, distribution and packaging may reveal new opportunities for tin plate. It is, indeed, a versatile product.

TABLEAU OF PROGRESS: Beginning tomorrow and continuing until Oct. 1, when the World Series will pre-empt attention, Cleveland will be the host to the exposition and annual convention of the Association of Iron & Steel Engineers. Throughout the years this event has grown steadily in scope and stature to the point where it now presents, probably better than any other medium, the annual panorama of technological progress in the iron and steel industry.

This year, to a greater extent than in previous shows and conventions, there will be striking evidence of the degree to which certain aspects of automation are beginning to creep into the industry. You will find the exhibits and technical program challenging and provocative.

ABILITY TO CONSUME: Since the end of World War II, there has been a parade of European and Asiatic industrial teams to the United States to study our methods of manufacture. In most of the reports of these visitations, members of the teams have stressed the unusually high investment in power and mechanical equipment per employee in American manufacturing establishments. They also have noted other characteristics, but thus far none of the visiting teams seems to have fully grasped the factors in the American system which enable tens of millions of wage earners to enjoy an exceedingly high standard of living.

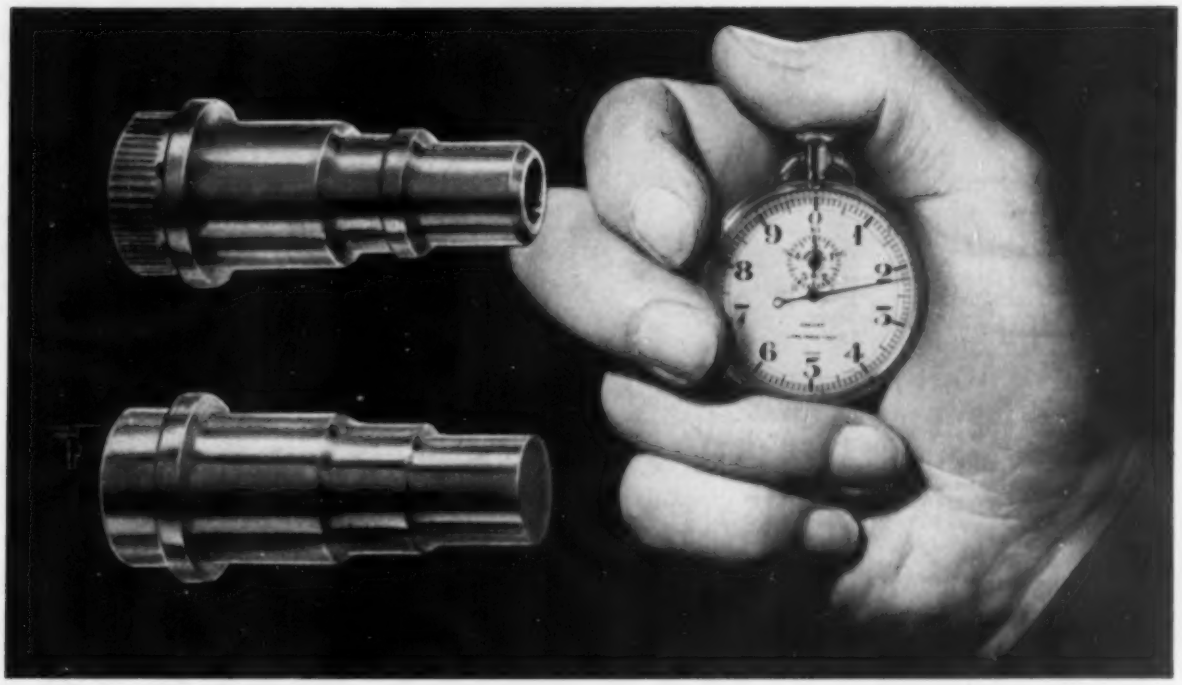
Soon a group of German industrialists (p. 48) will be inspecting American plants. One wonders whether in addition to obtaining the specific information they desire, they also will explore the economic features that make for high mass consumption in this country. It is one of the most significant characteristics of our system.

UP TITANIUM CAPACITY: This nation's efforts to speed up production of titanium are frequently in the news. The latest project to be announced is the building of a plant by Electro Metallurgical Co. at Ashtabula, O., (p. 47) to produce 7500 tons of sponge titanium annually. It will cost in excess of $30 million.

This and other recently announced additions to titanium capacity reflect the rapidly mounting appreciation on the part of defense authorities of the importance of titanium as an indispensable material for tomorrow's military aircraft. This recognition of the weight, strength, corrosion resistance and other advantages of titanium has led to several step-ups in the goal for annual titanium output. At present it stands at 37,500 tons, to be achieved by 1956. While this represents an astounding growth in a brief period, it would not surprise anybody if the goal were increased again before 1956.

RESTORED IRON WORKS: Among the 1500 persons who attended the dedication of the restored iron works at Saugus, Mass., on Sept. 17 were many who doubtless were impressed with the size and pretentiousness of this pioneer undertaking. "Hammersmith," as the Saugus iron works was called originally, employed about 80 workers. It consisted of a blast furnace, foundry, forge, slitting and rolling mills, warehouse and a shipping dock. Output of iron was about 150 tons per day.

The remarkable thing is that this establishment, which was comparable to some of the best in Europe at that time, was built in the wilderness of the Massachusetts Bay Colony in 1646, only 25 years after the landing of the Pilgrims. The First Iron Works Association and the American Iron & Steel Institute are to be congratulated for having done such an excellent job in restoring the Saugus iron works and making it available to public view as "the cradle of an American industry."



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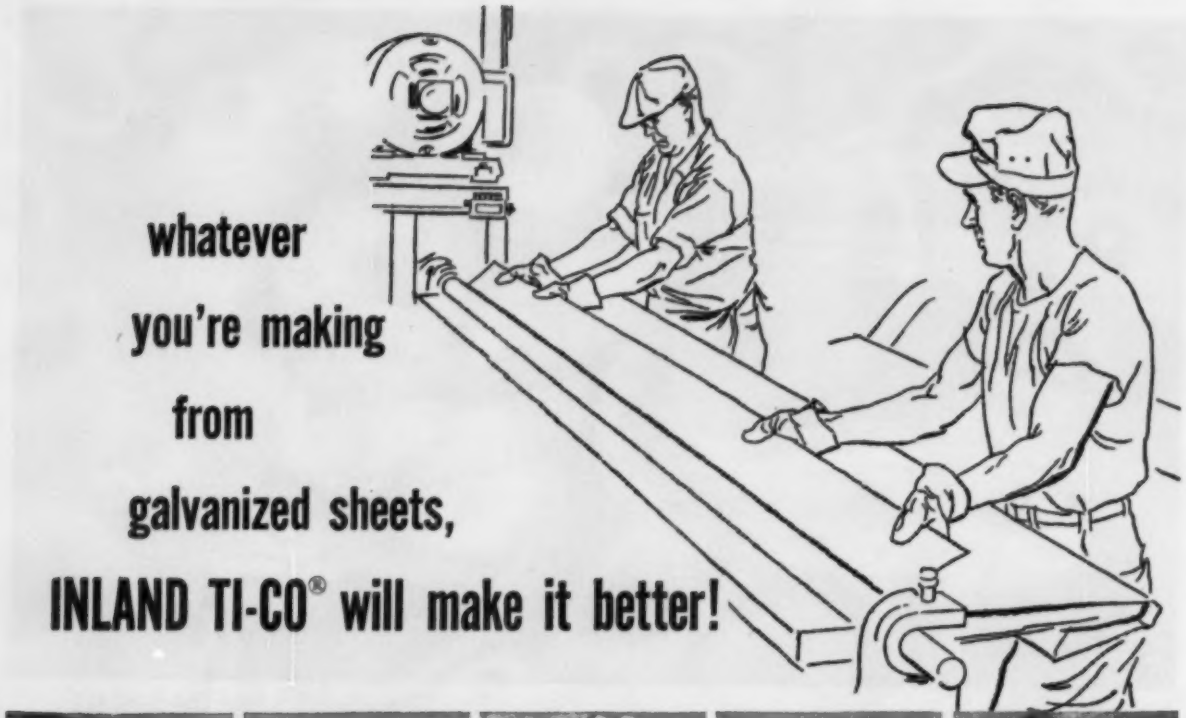

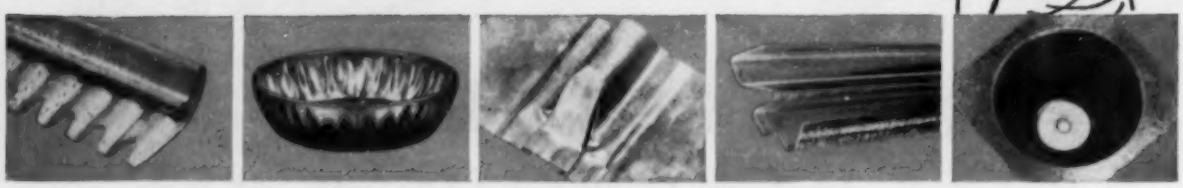

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INLAND TI-CO®... WITH THE ZINC COATING THAT ROLLS WITH THE PUNCH

Final 1954 car body is guided onto its frame as Packard completes model run. Workmen immediately started transfer of final assembly operations to the new Conner avenue plant, where 1955 assemblies will start Nov. 1

Automakers Get Set To Roll Out 1955 Models; Changeover Time Briefed

ON MAY 26, 1927, the last model T Ford was built. On October 20, 1927, the first model A Ford rolled off the lines.

That model changeover lasted five months, but this year Ford will accomplish a complete body changeover far more complicated than the model A body in about two weeks—for a given plant. Not only that, at the peak of the changeover during the third week in October this year only 30,000 of Ford's 130,000 hourly workers will be affected.

Quick Change — Perhaps even more impressive is the model changeover at Chevrolet. That firm will not only do a complete body change but will introduce a new V-8 power plant as well. Begun last week, it will be completed by about Oct. 4. Involving a completely new car, the change will also take only about two weeks.

And Studebaker, operating on an alternate week production schedule in August, quietly began producing 1955 cars on Sept. 7 without any major time loss for the model change.

New Models Roll — Production was scheduled to begin this week at Chrysler Corp. plants which closed down in mid-August for changeover. All cars of the corporation will have new bodies. The Plymouth, with a new V-8 engine, will be a completely new car. Also in the completely new car category is the 1955 Pontiac scheduled to resume production Oct. 4.

Major body changes coupled with a new V-8 engine, transmission and torsion bar suspension system contribute to the Packard shutdown from Sept. 16 to Nov. 1. However, the changeover is lengthened because production is being shifted to the Conners avenue plant from the East Grand boulevard plant it has occupied the last 50 years.

Sharing the Body—Nash-Hudson consolidation is contributing to a lengthy shutdown upcoming at American Motors in Kenosha, Wis. Both Nash and Hudson will share the same body shell with identification changes. This, coupled with body modifications for

Approximate Dates of Model Changeovers

MAKE	END 1954	START 1955
Chevrolet	Sept. 20	Oct. 4
Pontiac	Sept. 3	Oct. 4
Oldsmobile	Oct. 18	Nov. 1
Buick	Oct. 9	Nov. 1
Cadillac	Oct. 18	Oct. 27
Ford	Oct. 11	Oct. 25
Mercury	Oct. 18	Nov. 1
Lincoln	Oct. 18	Nov. 1
Plymouth	Aug. 13	Sept. 27
Dodge	Aug. 25	Sept. 27
DeSoto	Aug. 17	Sept. 27
Chrysler	Aug. 18	Sept. 27
Packard	Sept. 16	Nov. 1
Nash	Nov. 1	Dec. 15
Hudson	Nov. 1	Dec. 15
Willys	——	Nov. 20
Kaiser	——	Nov. 20
Studebaker	August	Sept. 7

1955 and engine swapping, makes the shutdown period somewhat indefinite. No prolonged shutdown is anticipated for the Rambler line.

Facelift and inventory are the order of business at Buick, Olds and Cadillac, which announced new bodies last year; while Kaiser and Willys production, now down since mid-year to permit dealers to reduce inventories, will remain there until the model changeover is completed about Nov. 20.

Omen—The model changeovers in metalworking's biggest market are significant for a number of reasons this year. Perhaps most important is that the scope of changes portends strong buyer appeal and a good auto year in 1955. A good year for the auto industry could well mean a good year for the economy generally.

Also of interest to metalworking men is the speed and efficiency with which the biggest model switch in the history of the industry is being effected. Machine tool builders manufacturing segments of production lines are supplying their competitors with design information hitherto unavailable in the interest of the line as a unit. Thus when the line is placed into position the capacities of the stations match and the units function as a single machine.

Preplanned—Important, too, in the rapid changeover on the assembly line is the preplanning of production engineers. Diagrams have been prepared months in advance, showing not only the small hand tools required at each assembly station but also exactly the sequence of welds and which nut is tightened when. That means training time for production people all down the line is minimized.

It should not be construed that headaches have been eliminated during a model changeover. But planning with plastic models and miniature assembly lines detailing the problems and enabling their solutions to be planned in advance have done much to smooth the operation.

Thanks to contributions of engineers in all phases of production and production planning, the model changeover in Detroit today is a far cry from the major dislocation of personnel and equipment it once was.

DuPont Magazine

Cool Casting

A neat industrial use of refrigeration is in freezing mercury to make forms for intricate metal parts. The frozen mercury shape is dipped in a ceramic slurry until the shell is of sufficient thickness. Then the mercury is melted out and the shell fired

Midwest Gets Two Stacks

McLouth and American Steel & Wire add nearly 1 million tons to area's pig iron capacity

WHEN McLOUTH Steel Corp. lit its new Blast Furnace No. 1 in Trenton, Mich., last Tuesday and U. S. Steel's American Steel & Wire Division, Cleveland, followed suit on Thursday, the pig iron capacity of the Midwest leaped upward by nearly 1 million net tons annually. Each furnace is rated at 1350 net tons a day or about 492,000 tons a year.

The similarity ends with the physical characteristics, however. At McLouth, the furnace is part of a $105-million expansion program, which makes that company a completely integrated steel plant. Capacity of Furnace No. 1 will go into finished products, which the company makes mostly for the auto industry of Detroit. When the expansion is completed later this year, McLouth's production of steel will be boosted to 1.2 million tons a year. Included in the expansion will be ore docks, bridges, electric furnaces, rolling and finishing mills and oxygen process.

More for Merchants—At Cleveland, AS&W's new furnace will produce merchant pig iron for the large foundry industry of the area. Total capacity at Central Furnaces & Docks will be about 1 million tons annually, all in standard northern foundry pig iron.

Cleveland is located in the center of the Great Lakes area, which boasts about 47 per cent of the nation's foundry capacity. It has often been on the deficit side of the pig iron supply ledger. Officials of AS&W feel that erection of the new stack that nearly doubles the division's capacity is in keeping with the increased demand of the area's foundries, including the huge new Ford Motor Co. foundry and engine plant.

Shuffle Coming — Output of the stack, which will be at normal operating levels about Oct. 2, will tend to cause a shuffle in the present market pattern. One area pig iron salesman says: "When you bring in that kind of extra capacity, there is bound to be a stiffening of competition. We'll all have to dig deeper for our business now."

Encouraging, however, is the feeling among producers that the bottom has been hit in the foundry business, and each succeeding month of the fourth quarter will show an improvement in pig iron demand.

One major producer points out that a fair-sized order was placed for future delivery, only to be changed a week later for immediate delivery. "The foundries have no cushion to fall back on now," he explains. "They all want their stuff now."

Plant May Be Moved to Market

Integrated production of expanded steel pipe in the hub of a wide area of demand—that's U. S. Steel Corp.'s objective in the proposed construction of a multimillion-dollar plant at its Columbia-Geneva Steel Division's Geneva Works in Utah.

Alden G. Roach, president of Columbia-Geneva and of Consolidated Western Steel Division of the corporation, said the new plant would replace pipe-building plants of Consolidated Western at North San Francisco, Maywood and Berkeley, Calif.

Critical Materials: Plenty on Our Side

Senate study says we're not exhausting our reserves, as many claim. But to assure a supplies-at-home program, we must make our minerals industries going concerns

IF WE'RE hemmed in by all-out war, we must depend upon the Western Hemisphere for critical raw materials.

But that prospect isn't as bad as it sounds, we're told by the findings of Senator George W. Malone's Minerals, Materials & Fuels Economic subcommittee. It condemns as costly the "misconception" that the U. S. has become a "have-not nation." This has caused vast sums to be spent in development of foreign resources that might be cut off in a war.

New View—Previous predictions that we were on the verge of exhausting our reserves of petroleum, iron ore, copper, lead, zinc, tungsten, mercury and other critical materials have proved erroneous, the committee states. But to make the supply available, we must have more "thriving, going-concern industries" in the minerals field. It recommends:

1. Congress should improve tax laws, including the liberalization of depletion. It suggests a study of the Canadian method of delayed taxation in critical mineral and material development. A review of the Securities & Exchange Commission duties and responsibilities is also asked in these words:

"The sale of securities affects the strategic materials program; it is recognized that the commission should assure complete information to potential purchasers of securities; and that its responsibility does not include determination of feasibility. Such a review should consider the advisability of a requirement that a thorough and confidential inquiry should precede any public announcement of an investigation of offered securities."

Here at Home—2. Titanium production, based on domestic raw materials, should be at least 150,000 tons annually. "Australia now furnishes the rutile for the Henderson, Nev., plant; India, the ilmenite for the New Jersey plant. Neither source would be available during war. There is more ilmenite in the United States and southern Canada than we can use in a century."

3. The tin smelter at Texas City should not be dismantled. Far East sources may be unavailable in war, and Western Hemisphere resources in Bolivia are more than adequate to meet U. S. requirements. It's essential that the nation have a "going-concern" tin smelter.

Step Up Research—4. More laboratory research, pilot plant experimentation and exploration are advised. "The difference between country rock and reserve ores often lies in an improved beneficiation process." Research, too, is needed on a larger scale to find new uses for materials and to develop suitable substitutes.

5. Goals for production of uranium for fuel to meet civilian and military requirements should be made adequate. Commercial use of nuclear power could be the greatest source of improvement, starting in the desert and mountainous areas where other fuels and hydroelectric potentials are high-cost or nonexistent.

Not Recommended — The subcommittee frowns on the recent talk of reviving the International Materials Conference on the grounds that "an international organization, setting up controls over distribution of production and consumption, could inhibit our own going-concern industries."

New Mineral Appraisal Urged

The nation lacks adequate appraisal of its mineral resources.

"Only 11 per cent of the continental United States is covered by geologic maps; estimates of reserves are meager; there has been no census of mineral resources since 1939," Felix E. Wormser, of the Department of Interior, told the American Mining Congress Sept. 20 at San Francisco.

The security of the United States and common sense dictate that we do not become dependent in wartime on remote foreign mineral resources.

Charging Buckets Loaded with Accurate Mixture

Using a 36-in. magnet, Thew Shovel Co.'s Lorain TL25-K crane loads cupola charging buckets with an accurate mixture of scrap and pig iron. The 2000-lb-capacity bucket is placed on a scale, and the crane operator loads it with the correct portion of each mixture to make a proper mix. Up to 120 tons daily can be handled this way. An overhead crane carries the bucket to the cupola

NEA

"We must fight big government-little people concept," U.S. Steel's Fairless says . . .

Business Must Lead Battle of Ballots

"CREEPING SOCIALISM" is becoming increasingly dangerous to business and the American people.

"The opponents of free enterprise" appear to be gaining ground, Benjamin F. Fairless warned the Manufacturers' Association of Connecticut Sept. 21 at Yale University. U. S. Steel's board chairman cited the debates on the atomic energy bill and the tax revision program as examples of the trend.

Misconception — In analyzing business efforts to defend the American way of life against socialism over the last 25 years, Mr. Fairless said the mistake has been that businessmen have too long tried to "go it alone." He went on to explain that the issues have not been made sufficiently clear to the public; it has appeared that business has chiefly been trying to save its own skin. The people have come to think of the struggle between socialism and business as a thing apart. They believe that they can afford to stand on the sidelines—as interested spectators —waiting for the best man to win.

Mr. Fairless urged that business can no longer afford to lead this fight single handed. It must make more effort to bring home the issues at stake to the voters.

Battle of Ballots—"This is a political battle which must be fought with political weapons," he proposed. "As a group, business is divided in matters of party allegiance, as are stockholders, workers and customers. Even if it wished to do so, business could not deliver an effective bloc vote at the polls."

He went on to point out that "the only weapon at our command is the power of patient persuasion in seeking to win the support of others to our cause." In considering the congressional elections, he observed that insufficient emphasis is being placed on the question of national freedom, concluding: "Too often, seats will be decided on local and personal issues."

Both Sides—In speaking of "opponents" to free enterprise, Mr. Fairless said: "I do not want to be misunderstood. I am not speaking in partisan terms. I am speaking of those members of both major political parties who would lead our nation further down the road to state socialism—the men who seek always to expand the powers of central government, to increase subsidy programs and to impose crippling burdens upon every form of individual enterprise."

He concluded by asking help in winning the "understanding and support" of America. If this could be achieved, he maintained, the people would refuse to accept "a return to deficit spending, to printing press inflation, to crippling economic controls and to all the other cockeyed nostrums, which were tossed out of the Washington medicine chest in 1952."

Managing the Debt

HANDLING the federal debt structure to balance out inflationary and deflationary tendencies has been suggested by the Committee for Economic Development.

"The main element in this change should be a reduction in the volume of debt due within one or two years, balanced mainly by an increase in the intermediate debt, say of 5 to 10 years maturity, and by a smaller increase in the longer-term debt," says CED.

Shifting Ratios—While noting the ratio of total federal debt to national income has declined from 127 per cent to 74 per cent, the committee points out the reverse trend was true of short-term marketable debt. At the end of 1953 the ratio of one-year debt to national income was slightly higher than at the end of 1946 and 4½ times as large as at the end of 1939.

"If we do not take every opportunity (to lengthen the debt) we shall slip backward, for the mere passage of time is working to shorten that maturity of the debt," says the CED report.

Shock Absorber—What is actually called for by the CED report is not a sudden shift from short term to long term financing, a decidedly deflationary move. It proposes a more modern debt-lengthening program.

Full text of CED policy statement, "Managing the Federal Debt," can be obtained from committee headquarters in New York.

Labor and management "have an obligation to stockholders," McDonald proposes . . .

Mutual Trusteeship— New Two-way Street In Labor Relations

NEA

DAVID J. McDONALD pioneered a bold new concept of labor unionism last week. Rebuffing both Socialists and one-sided union firsters, the president of the United Steelworkers gave the word "We" a new dimension in labor statesmanship.

Keynoting his union's convention in Atlantic City, he proposed: "We (management and labor) are engaged in the operation of an economy which is a sort of mutual trusteeship."

Significance: In Mr. McDonald's words, the steelworkers have taken a position between the two groups of the trade union movement: 1. The group with the Marxian approach and 2. the group with the bread and butter or "we'll take all, devil get the hindmost" approach.

"What do I mean by that?" asked the Steelworker head. "The days of the Andrew Carnegies are gone. . . . Hundreds of thousands of stockholders now own the great corporations of America, particularly the steel industry.

"Stockholders employ a group of managers. Another group of employees is the working force. Both groups have this mutual trusteeship that operates these steel companies. . . . Certainly managers must give full consideration to the just claims of the workers. Certainly the working force must see to it that steel properties operate successfully. . . .

"Both, of course, have an obligation to the stockholders, because if there is not invested additional capital, new money flowing into these industries, then we will have a decadence set in in our country. That we will not stand for!"

To some labor observers, the new concept signaled the beginning of the payoff of the McDonald-Fairless tour of U. S. Steel Corp.'s plants last spring. The gesture was at first accompanied by much skepticism. Some interpreted it as a grandstand play. But those closer to the tour reported that the union president was impressed with the actual status of the worker and the opportunities available to him.

And if this is a new union philosophy, the question arises—will the other unions follow?

MESA Accepts CIO Charter

Mechanics Education Society of America has affiliated with the CIO.

MESA has long been a thorn in the CIO's organizing campaigns in shops in Ohio and Michigan. Under its CIO charter, MESA will continue its own administration and representation in shops it now holds.

The first union to organize the auto industry on a plant-wide basis, the society represents about 52,000 workers in 127 plants.

GM Diesel Gets Contract

Cleveland Diesel Engine Division, General Motors Corp., has a contract from the Maritime Administration for production of a free-piston, gas-generator turbine. The unit is to be installed in one of four Liberty ship conversions to determine the best methods of refitting the idle fleet of 1500 Liberty ships. Goal is to lower operating costs and increase speed.

A contract has already been let to General Electric Co. for a gas turbine unit for a similar installation; contracts are planned for a steam turbine and a geared diesel engine drive. Other equipment to be tested in the program include an improved, extra-large, controllable-pitch propeller and modern loading and unloading equipment.

Industrial Pallets: Standardization Is The Big Problem

About 41.5 million wood, metal and disposable platforms of all sizes solve many problems in materials handling but create many others in transportation and storage

PITY THE POOR PALLET.

Carrying the burdens of industry cuts its average life span to three years. Though a basic tool of materials handling, it's still considered somewhat of a nuisance. If that isn't enough, makers of materials handling equipment are trending away from pallets where feasible.

1500 to 1 — The average fork truck used in warehousing or storage has over 1500 pallets behind it. Of the estimated 41.5 million pallets in use today, exclusive of government and military, 81 per cent are wood, 14 per cent are expendiable types and 5 per cent are light metal. Last year the 40-odd established manufacturers in the field turned out about 13 million pallets at a dollar volume approaching $100 million. Because special equipment is not needed for producing them, every saw mill in the back woods is a potential pallet maker.

Myriad applications of the lowly pallet help spawn an almost infinite variety of sizes, types and styles. A catalog of Acme Pallet Co. lists 104 sizes in seven types—and many others are built to order, according to Acme. Comments Pallet Sales Corp.: "There's no such thing as a standard line of pallets, though some may have the same over-all dimensions." At the price wooden pallets are sold (10.5 to 11 cents per board foot), manufacturers can't afford to stock them.

Aim at Standardization—Despite these difficulties, pressure is growing to standardize pallets used in transportation. An American Standards Association committee, meeting Sept. 27-30 in Chicago at the Society of Industrial Packaging & Materials Handling Engineers Exposition, will consider the problem. International standardization will be studied Oct. 12 in Paris at an International Chamber of Commerce commission meeting on transport.

Palletization (and standardization) got its greatest impetus during World War II when the government set unit pallet loads, and manufacturers had to get used to them. About 20 per cent of the pallets made today are 40 x 48-in. two-way or four-way types. The 32 x 40 in. size is popular for light manufacturing operations and warehousing and is recommended by the Commerce department as best adaptable to needs of smaller retail merchants. The 40 x 48's big advantage is rail-truck interchangeability; it can be placed end-to-end in freight cars and side-by-side in trucks.

Ultimatum — Manufacturers say pallets must pay for themselves in saved loading time or they're not economical to ship. On some shipments pallets must pay the rate of the commodity they carry, though concessions have been made in places. Even so that's 60 to 70 lb of waste transportation cost, and many shippers unload from pallets into cars or trucks and let the customer worry about handling at his end.

Two major railroads report 72 sizes of pallets they must handle. Another says shipping rates could be cut startlingly if a dozen or less sizes and types were specified. Free interchangeability of pallets among shippers probably will never come, say transportation authorities. Industry men say charging for pallets as handling gear or at tonnage rates would encourage their use.

The auto industry specifies palletization on many incoming shipments but finds it doesn't pay to retrieve and return pallets to suppliers. Some outstanding progress of standardization within companies is being shown though. Sears Roebuck & Co. have been able to standardize on three pallets to handle 97 per cent of its diversified merchandise. Radio Corp. of America uses one basic pallet (48 x 42 in.) in over 90 per cent of its plants. General Electric Co. has shipped electric motors weighing up to 250 lb from coast to coast

on impregnated cardboard pallets. The French Line has standardized on a 48 x 48 in. pallet for ocean shipping, storing cargo on pallets for easy unloading. Most stevedoring companies utilize a 48 x 72 in. pallet, unloading cargo in holds.

The Problem—What's needed to push standardization? Industry authorities offer a variety of suggestions:

1. Desirable pallet load is 2000 lb. An expendable pallet costing $1 (they range from $3 to $8 now, with the average cost below $5) would allow economic shipping. Standardization would encourage mass production and lower costs.

2. A sound research program on costs—of use, repair and shipment—would provide statistics to back up recommendations. One such study found each repair costs an average of $2, and three such repairs are possible during the pallet's life. That total exceeds the cost of most new pallets.

3. Purchasing departments should take more care in selection of pallets. They spend more money on pallets than on fork trucks but seldom give the former purchases as much thought.

A step toward standardization is found in proposals of National Wooden Pallet Manufacturers Association, Washington. It establishes two industry grades of pallets, sets up a numerical system for pallet type designation and places new limitations on fasteners, lumber requirements and manufacturing practices. It affects general purpose units used in warehousing and shipping.

Truckers Form Trailer Pool

As part of a plan to eliminate empty runs, 12 midwestern trucking companies have given Fruehauf Trailer Co. a "pool" order for 500 trailers. The $4 million involved represents the largest single order for trailers on record in the U. S.

The group, known as National Trailer Pool Inc., with headquarters in Minneapolis and St. Paul, will have about 2000 trailers in the pool, 1500 of which have been assigned to the venture by members in exchange for stock. Any member can draw equipment and return it to the pool in any city.

Electromet Readies for Titanium Debut; Will Produce Sponge by New Process

AT LEAST 7500 TONS of titanium will be made each year by Electro Metallurgical Co., division of Union Carbide & Carbon Corp.

The $31.5-million plant the company is building at Ashtabula, O., is of first importance in government plans to bring capacity up from a 1948 low of just 3 tons to 22,500 tons annually. It's the first commercial facility not using the Kroll process and is expected to be in full production in about two years.

Background — The Electromet process produces sponge by sodium reduction of titanium chloride. Five years of research and $2 million went into its development to the pilot plant stage at the company's Metals Research Laboratories at Niagara Falls, N. Y.

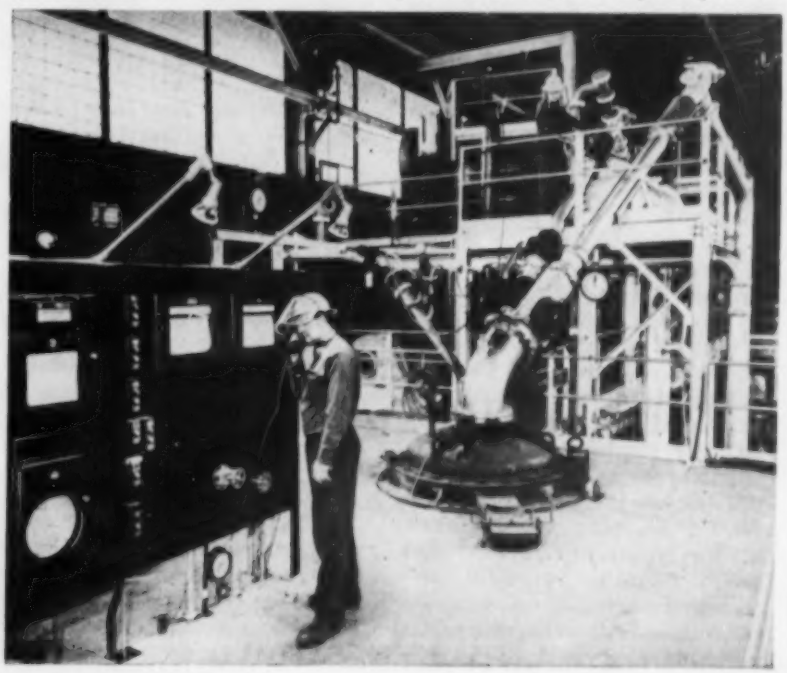
Contract for the plant was signed with the General Services Administration, which will have an option to buy 4500 tons annually for the current price at delivery time. Electro Metallurgical, in turn, will have the right to deliver to the government whatever production it cannot sell on the commercial market, up to a maximum of 6000 tons per year.

Timing — The agreement is to run for five years after the plant starts to produce in commercial quantities. However, the government can cancel on one year's notice by paying the company an amount equal to the unamortized cost of the plant.

Titanium's primary market is at present in jet planes and other aircraft applications. But as increased production brings down cost, it is expected to find many other uses where strength, heat resistance and corrosion resistance are important. Both chemical and petroleum industries also offer sizable future potential.

There will be a complete roundup of titanium's present and future in the Oct. 4 edition of STEEL.

The new look in titanium: Ashtabula, O., will be scene of plant making 7500 tons yearly by 1956, using sodium reduction process shown here as a pilot operation



By E. C. KREUTZBERG Washington Editor

Germans Come To See Free Enterprise In Action; Others To Study U.S. Government and Business Methods

GERMANS who will be here in October to get a first-hand look at American methods of marketing steel products stand head and shoulders above the general run of such visiting groups. They represent top management of the German steel industry.

They are men who know their business, and their's isn't the usual objective—a training in American technical know-how — that brings them to this country. Rather, it is an attitude of skepticism in regard to the tales they have been hearing about the American competitive system.

Trained in the use of cartels that fix prices, allot territories and set tonnage limits, they just do not believe there is no trace of this in the American system.

Clear Picture — The American invitation, incidentally, arose from a tendency toward increased use of traditional cartel methods under the European Coal & Steel Community, even though this community's charter is supposed to prohibit their use. It is hoped that the contacts the Germans have in the United States will give them a clear picture of how each steel company does its own sales job—from promotion to distribution—in competition with other companies in the industry.

The schedule has not been completely set up, but there will be visits with American Iron & Steel Institute, one or more advertising agencies handling steel company accounts, American Marketing Association, Harvard School of Business Administration, United States Steel Co., Inland Steel Co., University of Chicago and a number of other steel companies and possibly some consumers.

Lucky 13—The group will include 13 executives from owners to sales managers and plant managers. They will come from all sections of West Germany.

No Burden on Taxpayers . . .

Another respect in which this visitation is unique is that the Germans will pay all their expenses here. Uncle Sam pays only the salaries and expenses of those employees in the International Trade Development Division, Bureau of Foreign Commerce, Commerce department, who will shepherd them. Their salaries and expenses continue regardless of assignment.

It is expected that following the Germans' visit, other western European countries will send delegations of steel sales managers on a similar errand—but such trips are still to be arranged.

More Help for Point Fours . . .

Another unit of the Bureau of Foreign Commerce — the Foreign Economic Development Staff—has organized a class of executives from Point Four countries to study American governmental and business methods over the next eight months. A. K. Taskean, of the Pakistan Industrial Development Corp., who is charged with development of the Pakistan paper industry; A. M. Nasseri and A. H. Azari, officials of the Iranian national oil industry; and Hasan Daghastany, Mecca, Saudi Arabia, Chamber of Commerce official charged with pushing the industrialization of Saudi Arabia, have been enrolled in business management and allied courses at University of Toledo, Toledo, O. In January they will start interviews with American businessmen.

Three others interested in helping industrialization from the government side are enrolled at American University, Washington. After that will come a round of interviews with American government officials and businessmen. In this group are F. Amir-Ebrahimi and H. Motahari, of the Iran Seven-Year Plan Organization, and Y. Homayounfar, of the Iran Ministry of National Economy.

small part...

BIG PROBLEM

Another Case History showing how CSS metallurgists can help you solve problems involving stainless steel

THE PROBLEM: The manufacturer of this aircraft pump plug had encountered no rejections until specifications were changed to increase operating pressure. When the same plug was furnished under the new specifications, rejections ran from 60 to 80 per cent due to leakage.

THE SOLUTION: Tests of the material being used showed metallurgists at the House of Stainless that the leakage was caused by numerous sulphide stringers in the material which provided paths for air leakage under the higher pressure. To overcome this weakness, Type 302 Stainless was recommended because it is free from sulphide stringers and has superior chemical, physical and mechanical properties. The plugs now machined from Type 302 bar stock, as illustrated, are proving satisfactory in service. Rejections are negligible.

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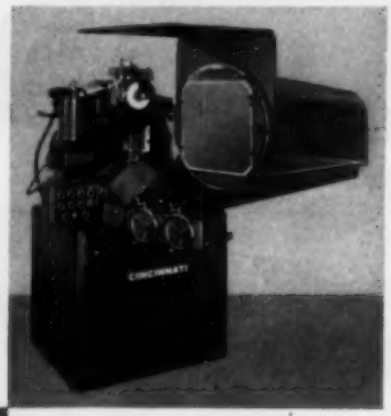

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Cutter Sharpening Machine

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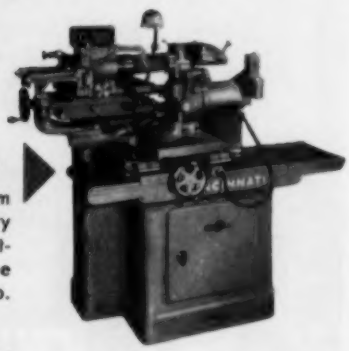

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A New Name in Steel: Venezuela

Plans are jelling for a national steel industry for Venezuela. Neither foreign capital nor foreign labor is to be leaned on heavily. Cerro Bolivar ore to be used

NATIONAL steel industry for Venezuela is past the talking stage. Plans call for operation of a 132,000 to 165,000-net-ton steel plant in Venezuela by late 1957 or early 1958.

With iron ore beginning to flow in heavy quantities from the Cerro Bolivar mines (see the following story), the site of the Venezuelan national steel plant is to be six miles from the Cerro Bolivar rail line to Puerto Ordaz. The plant will be between Puerto Ordaz and San Felix at the junction of the Orinoco and Caroni rivers.

Steel, Power and Coal—Birth of the Venezuelan steel industry is divided into three phases: The first covers the steel plant itself, including construction of a new town for the 2000 workers and their families; the second provides for construction of a hydroelectric power plant utilizing the lower Caroni falls; and the third phase provides for development of the Naricual coal deposits in Anzoategui state for coal requirements of the steel plant. Limestone will come from Naricual also.

In the beginning only structurals, reinforcing rod, pipes, wire and plate will be produced domestically. Venezuela imported about 550,000 net tons of steel products in 1952, more than 495,000 net tons in 1953, of which more than 50 per cent was steel piping.

Government-Owned — Total cost of the project is estimated at about $100 million. It's interesting to note that, though foreign and private Venezuelan capital may be invited to participate in the project, the Venezuelan government plans to keep financial control of the business.

One of the steps already being taken toward developing the Venezuelan steel industry is the training of technicians. Venezuela intends to be independent of foreign technicians practically from the outset of production. Government scholarships are available for study in the U. S. and Europe for all types of management, from plant managers to foremen. Engineers are to be trained in both Venezuela and abroad. The co-operation of the United Nations has been enlisted for setting up the training programs. The Venezuelan Central University is going to establish a School of Metallurgical Engineering starting with the coming college year. It is expected that nearly 400 Venezuelans will soon be in training; the first group has already left the country.

Ore Shipments Jump

Venezuela exported more iron ore during the first six months of 1954 than during the whole of 1953.

	Net tons
1951	763,451
1952	2,097,340
1953	2,170,017
1954 (6 mo.)	2,401,762

Monthly export figures for 1954 for Iron Mines of Venezuela (Bethlehem Steel Corp.) and Orinoco Mining Co. (U. S. Steel Corp.) show the almost constant increase in Orinoco Mining shipments and their vital role in total Venezuelan exports of iron ore:

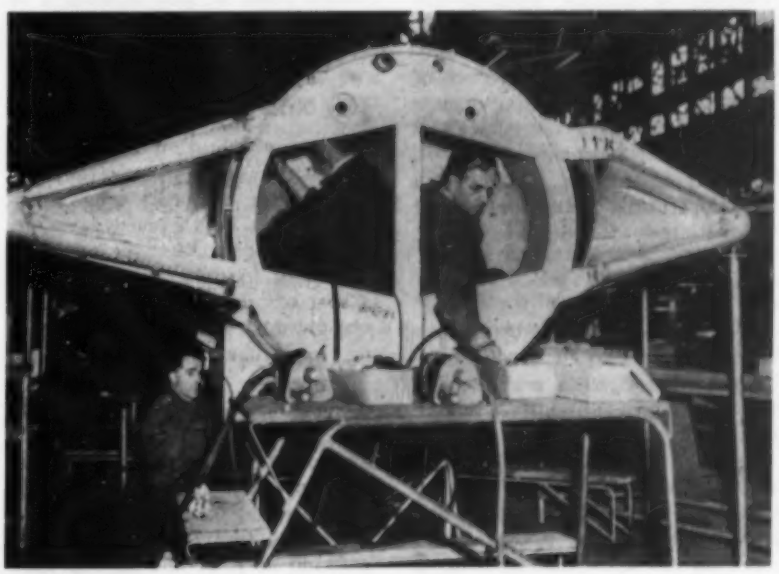
(In net tons)

	Iron Mines	Orinoco	Total
Jan.	281,313	22,380	303,692
Feb.	361,804	45,568	407,372
Mar.	185,581	97,365	282,946
Apr.	197,480	165,790	363,270
May	214,429	308,430	522,859
June	250,951	270,673	521,623

Europe's Output Still Up

Total steel output of major European producers jumped to 5,473,000 net tons in August, 1954, an increase of 879,000 net tons over the previous month. Helping to add up to that increase were the output increases of Belgium (441,000 net tons to 464,000 net tons); Netherlands (86,000 net tons to 95,000 net tons); and England (1,264,000 net tons to 1,564,000 net tons).

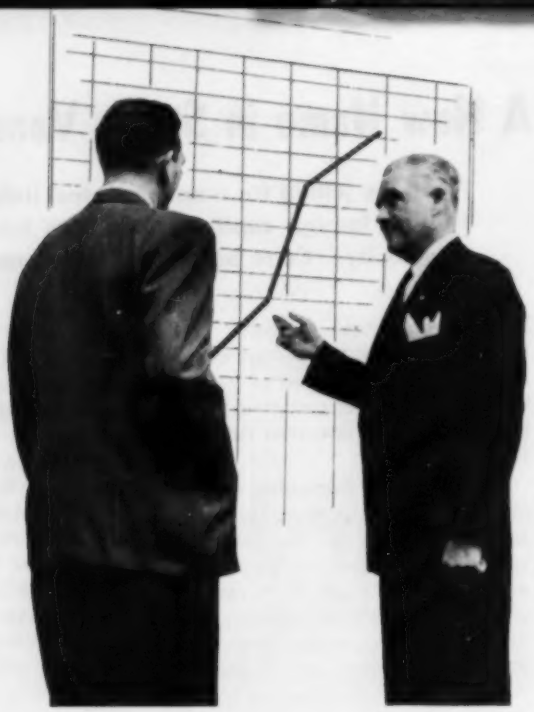
Steel production declined in France (1,271,000 net tons to 1,143,000 net tons); West Germany (1,738,000 net tons to 1,718,000 net tons); Luxembourg (277,000 net tons to 271,000 net tons); and Italy (396,000 net tons to 339,000 net tons).



Making Ears that Breathe

Workmen are putting the finishing touches to the two ear-like air intakes of a Hawker Hunter jet airplane. Scene is at the Hawker Blackpool, England, plant

Budgeting for Middle Management..Make It Pay Off More



By JOHN T. GARRITY
McKinsey & Co.
Management Consultants

"BUDGETS are just a series of bad guesses . . . that headquarters uses to beat us over the head during the course of the year."

If such is your opinion, here's news—it isn't necessarily so.

Drawing the Line—Budgets are becoming recognized by more companies as a real working tool for middle management, especially as competition stiffens. Budgets are useful tools for planning and coordinating operations to reach predetermined goals; they also are of great value in controlling operations and measuring executive and supervisory performance.

In simple wording, budgets can help operating management get production out faster and cheaper.

What Is a Budget?

Of course, not all budgets work that way, and, in fact, not everything called by the name is actually a budget. Basically, a budget is nothing but an *operating plan* expressed in money and broken down by the department heads responsible for producing income and spending the money.

Every level of management is familiar with operating plans. The instructions a superintendent gives his foreman for the coming shift are an operating plan; a short-term one certainly but still a plan. Manning tables, production schedules, product specifications, machine lubricating charts, labor contracts—all are operating plans of a sort middle management recognizes. Some plans extend over a much longer period than a yearly budget; some less.

The point is that a budget is nothing more or less than an operating plan.

Why Distrust Budgets?

Perhaps operating management distrusts budgets because they are less specific than the other operating plans in use everyday. Or, perhaps, the fact that the budget is expressed in dollars and cents is a root of mistrust. It is true that accountants can manipulate figures to prove almost anything.

But money is important to a budget because it is a common denominator. It's possible to compile and compare many different things on this one basis. A direct labor budget could be just as easily expressed in terms of so many men working at such and such a level of efficiency for so many hours. The maintenance material budget is basically just a long list of parts that management expects will be used, taking into consideration the preventive maintenance program and any anticipated machine rebuilding. But all these dissimilar factors must be converted—for the sake of comparison—into the universal language of business: Dollars and cents.

Sometimes budgets are misused as clubs or unyielding criteria, justifying the foregoing opinion and mistrust of budgets. In Company A, for example, management was using a fixed profit forecast as the basis for measuring operating performance without making allowance for differences in volume, material prices and other factors which were beyond the operating management's control. In other cases, budget time seems to be open season on operating personnel. Occasionally, the budgetary control program is so complex and the terms used are so foreign to operating personnel that the program has little meaning.

Even though the responsibility for these weaknesses rests primarily with top management and financial personnel who design and administer budgets, the informed and constructive criticism of operating personnel can do much to eliminate the flaws. And it's worth

the effort for the following reasons.

How Budgets Help

Giving budgetary matters the time and attention they deserve helps the operating supervisor become familiar with the budgetary control system. Said one superintendent: "When people told me that I had a 'deviation variance,' I didn't know whether to laugh or cry." (Deviation variance, in this case, meant the extra loss incurred by producing goods on equipment other than that specified by the production schedule or by using process material not so specified.) Today, since that superintendent has taken time to determine what each item in his budget means and how it is derived, he is able to use the budget as a short cut toward finding trouble spots in his department.

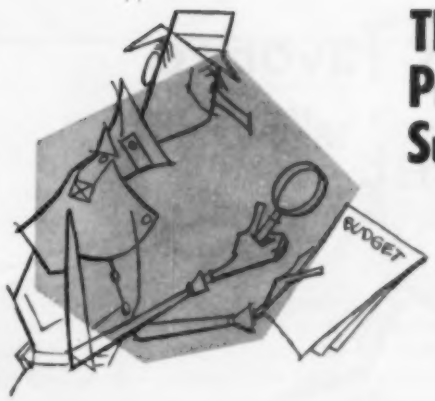
Of perhaps greater importance, time spent in helping develop the budget gives operating supervisors an opportunity to get acquainted with over-all objectives for the coming year. That, in turn, helps them be sure their efforts are tied in with company objectives.

Finally, budget-building time gives middle management a chance to improve its performance and produce visible results to promotion-minded top management, a peculiarly difficult handle to grasp at times.

The day is gone when nearly any company can make a profit merely by being in business; promotions to individuals will tighten up in such circumstances, too. The budget can be a tool for ambitious middle management to prove itself or improve itself.

Budgeting Benefits

1. Greater familiarity with how the budget system works
2. Clearer knowledge of company objectives
3. More help from other departments
4. Means of demonstrating improved personal performance
5. Greater control in supervision of his own department
6. Less chance of criticism from top management



The Case of the Press Department Super . . .

Step by step from falling production to better-than-ever production. Budget proves to be key clue

THE SUPERINTENDENT of the press department of a metal fabricating company got a shock when working with the plant accountant on his direct labor budget: Performance in the super's department had dropped from 100 to 75 per cent in a little over three years.

"Heads will roll," growled the super.

Up-to-Date—First, the super had cost accounting and industrial engineering departments review the standards that had been set about four years previously, to ensure that they still applied properly. Then he started a detailed review of manpower, layout and manufacturing methods with the help again of cost accounting and industrial engineering.

The super found that he had failed to train his force adequately. The retirement of a few "old hands" had stripped him of seasoned manpower. Next, he found that his production runs were somewhat shorter, though volume had increased. The super determined that his materials handling equipment and manpower had failed to keep pace with the higher volume. He was able to demonstrate to management that its "low inventory" policy was really more expensive in the long run.

A review of product quality from a prior department showed that its quality was off somewhat—not enough to increase the other department's rejection rate substantially, but enough to slow down his own department's production rate.

Little Holes—That's what the super found: Many reasons why performance was down, none large enough to cause real concern of itself.

How did the time this super spent on the budget pay off? Most outstanding result was that his department's performance rose from 75 per cent to 115 per cent the following year, and, to date, it is still improving.

Sharper Tools—Further, he was able to review his performance over a longer period and spot trouble areas not apparent in daily or monthly reports. It gave him a chance to acquaint industrial engineering, cost accounting and the other staff and service departments with his problems. That, in turn, got him a better budget and a more effective control tool.

Other benefits which resulted from this budget study were not immediately measurable in performance indexes. The better budget meant the super could do a better job with less effort. He had a yardstick of performance which enabled him to take remedial action quicker than he had been able to before. The superintendent did not have to concern himself with every dollar spent—only with those items which varied significantly from the budget. His superiors had more faith in the budget for his department, and consequently the super had to spend less time "on the carpet" explaining what was going on in his department.

It's too much to say this super is purring like a kitten, but it's an acknowledged fact that the people who work for him and the people he works for find him much easier and better to work with now.

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The Cadillac Story—Quality Plus Tailfins and Applied Snobism

DETROIT

CADILLAC a short time ago produced its 1.5-millionth unit since it entered auto production in 1902. Although that may sound like a lot of tailfins, bear in mind that Chevrolet or Ford can exceed that number individually any old single year they feel like fighting. All of which adds up to the fact that Cadillac enjoys a position unique in the industry, something known to almost any boy of seven.

Many boys of seven and older, however, do not know that Cadillac is the oldest Detroit auto manufacturer. From its ancestor, the machine tool firm of Leland, Faulconer & Norton, the workshop producing the Cadillac Model A in 1902 brought to the infant auto industry precision manufacture. This transferred skill reached its best-known level in the year 1908 when three Cadillacs were disassembled and the parts reassembled at random, proving interchangeability of parts and winning the firm the Dewar trophy of England's Royal Automobile Club.

Quality First—In the meantime, the Cadillac plant in Detroit had been growing. By 1906 its output nearly equalled that of any two automakers combined, but it was then that the decision was made to concentrate on quality rather than quantity. Having already replaced the 10-horsepower, one-cylinder runabout engine with a 30-horsepower, four-cylinder engine in 1905, the firm was purchased by General Motors Corp. In 1909 and in 1910 it became the first manufacturer to offer closed bodies as standard equipment. These coffin-like crates with windows were the beginnings of the vaunted Fleetwood body now accepted by many as the nicest way to go.

It is interesting to note that until 1908 a Cadillac cost about one-half the national auto price average. As luxury increased, the prices moved to the national average in 1910 and some time later they were up to four times the national average. Today, as everyone knows, a Cadillac costs only one and one-half times the price of the average American car.

Some Firsts—But to return: In 1912, Cadillac again won the Dewar trophy for introduction of the electric self-starter, electric lighting and ignition. Late in 1914 the firm introduced the country's first production V-type, 8-cylinder engine, abandoning the four-cylinder job which had boosted Cadillac production to seven times its 1908 level. The V-8 has remained the basic Cadillac power plant right to this day with a couple of dips into the V-12 and the fabulous V-16. Other contributions prior to the first World War included thermostatic cooling system control and tilt-beam headlights.

Following the close of the war, Cadillac moved to increase luxury with carburetor control, crankshaft counter-weights, crankcase ventilation, synchromesh transmission, hydraulic valve silencers, ball-bearing steering, etc. In 1936, the firm introduced its 346-cubic-inch, L-head, V-8 engine, a notable reversal of the cubic-inch tendencies of the late twenties and early thirties.

Still Growing—Halting auto production for the first time since 1902 during World War II, the firm returned to the fray with a new, OHV V-8 in 1949, found production reaching over 100,000 in 1950 and 1951 to nearly double any prewar year. Recent firsts include the standardization of Hydra-Matic transmission, dual exhausts and power steering.

As reported earlier in STEEL, Cadillac is currently completing an expansion that will increase normal working day production potential of Cadillacs by 40 per cent. Including such features as a new three-story plating building, additions to final assembly, engine machining and sheet metal facilities, the expansion portends that 140,000 Americans will be driving 1955 Cadillacs when the 1956 models come out.

Problems and Snobs—That in itself is a mixed blessing, somewhat enmeshed in the intangible problem of what makes a car "the" car. Nobody glares at a man driving a brown 1954 Cadillac like another man driving a brown 1954 Cadillac. These buckets, to maintain their distinctiveness must be somewhat rare, whether by calculation or by happenstance. It would also be nice if the cars were not driven by race track touts, eminent mobsters and successful enemies of

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732	713,778
July	543,540	756,592
August	523,790	640,186
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,815,877

Week Ended	1954	1953
Aug. 21	121,736	163,635
Aug. 28	113,496	152,866
Sept. 4	110,995	132,574
Sept. 11	84,556	122,863
Sept. 18	73,100	146,912
Sept. 25	76,000*	140,953

Source: Ward's Automotive Reports.
*Estimated by STEEL.

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society generally. The problem is that these things happen despite what may be done in price or limiting production, all of which adds up to a knotty problem in applied snobism or something of the sort.

Cadillac may admit that such problems cross its brow privately, but there appear to be a couple of definite keys to the Cadillac success: One is the fact that Cadillacs are never mistaken for any other make of car. Laugh if you want at that fantastic finned overhang, but it protrudes into prestige. The second is the fact that the Cadillac, luxury not withstanding, is still underneath it all a most decent sort of machine that digs and handles in all-American style.

The Glen Yen Again

The reason for the sudden urgency of the Cadillac history recited above is the seventh annual Watkins Glen Grand Prix at Watkins Glen, N. Y. Attendance at this event is something for which most enthusiasts would gladly divorce their wives, throw over their jobs and drive their Jaguars cross-country in first gear.

It may surprise you to learn that this event cleans engineers out of Detroit like Hurricane Edna in a henhouse. For although the neophyte will tell you that people come for the races, the perceptive realize that it is the fairyland of exotic machinery that makes Watkins Glen the mecca it is. Stylists and engineers go down to revel in the inscrutable glory of their counterparts abroad who are not husbanded by sales departments. These are autos built for the sake of art.

Here you will see Bugattis, Bentleys, Delahayes, Ferraris and Pegasos. Also present this year was Briggs Cunningham wearing an exciting Mercedes 300 SL coupe, which his mechanic explained would not actually do the reported 175 mph at all but pooped out at around 155 mph. Bumper to bumper down the main street were Rolls-Royces and Alpha Romeos, Fiats and Allards. And the Jaguars, Porsches, MGs and Austin-Healeys were embarrassingly common, given a second look only by small girls bored eating ice cream cones.

This is the event for the connoisseur, the man who accepts refusal to compromise in the pursuit of an automotive design ideal. These are the cars that explore the limits in power, in silence, in speed, in handling, in flamboyant styling. These are cars as provocative as they are exciting, as cantankerous as they are beautiful. These cars breathe the stimulation of ideas come to life.

For this, automotive engineers go to Watkins Glen along with thousands of other automotive enthusiasts, though of course there is the race. In the hope that you may be interested, Doc Wyllie won the Seneca cup in his C-type Jaguar, Gus Ehrman nosed out Ralph Durbin in the production MG race to take the Collier trophy, Dick Perrin won the Glen trophy in his M Jaguar and Frank Botts captured the Queen Catherine cup in his OSCA.

In the feature Watkins Glen Grand Prix, Bill Spear finally got his Ferrari off the grid uneventfully only to lose the rear end after leading for eight laps. His tour at 86.5 mph stood as the fastest lap of the day, though Phil Walters went on to take the race in his Chrysler-powered Cunningham. Jim Kimberly finished second in his Ferrari with Sherwood Johnston third in another Cunningham.

Turning the Heat on at Ford

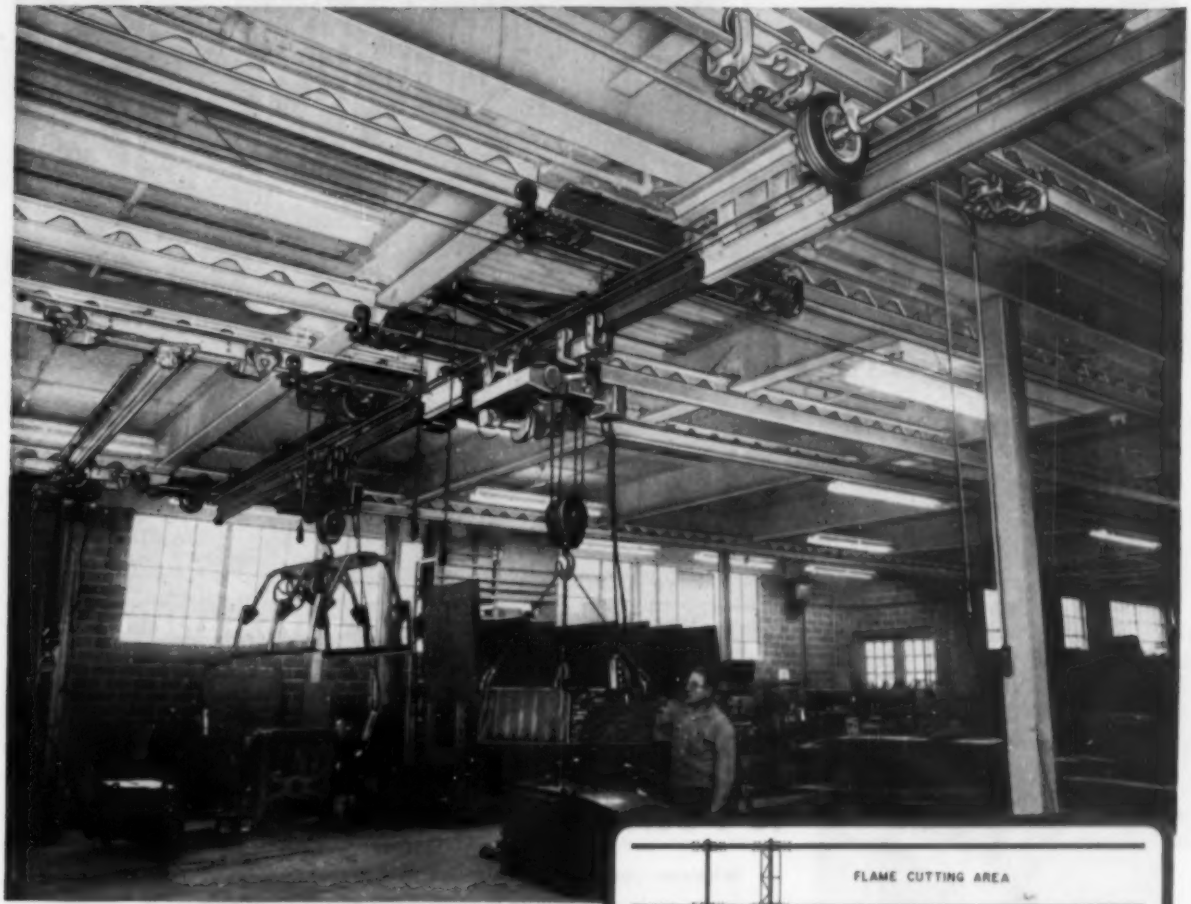
Axle shafts are loaded into an automatic induction hardener at Ford Motor Co.'s Mound Road plant. This heat-treating method makes axles tougher, uses less fuel and floor space and provides safer working conditions for employees than previous methods

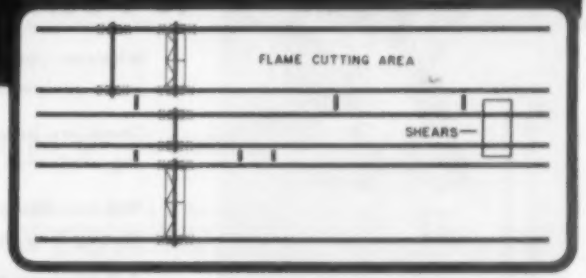
Exhaust Notes

U. S. Rubber announces a new puncture-sealing tube containing a plastic sealant that will not flow or bunch up to cause out-of-balance tires, a severe criticism of previous puncture-proof offerings.

With the final car built at the East Grand Blvd. plant, Packard began shifting final assembly operations to its Conner Avenue plant. Involving the transplanting of three miles of conveyor lines, 5000 tools and other equipment, the shift will take 45 days. The Conner plant is being renovated for Packard assembly and sub-assembly.

Need plant-wide handling?





Here Louden can serve you best

Typical of how Louden Engineered Handling Systems can integrate the handling operations in an entire plant or any part thereof, is the installation shown above. Here an eastern manufacturer uses a Louden Interlocked Crane and MotoVeyor System to cover unloading, storage, shearing and flame cutting. A Louden MotoVeyor picks up a 5-ton bundle of steel sheets or bar stock from a truck, travels via transfer sections from one crane to another, there to unload in storage, or to carry its load to shears or flame-cutting department. It does this without setting down the load, without rehandling, without delay or interference to other operations.

Handling costs are *always* cut, handling is *always* accelerated, manpower needs are *always* reduced, production *often* increases when Louden *engineered* systems take handling out of the hands of men, off the floor, out of the way of production. From integrated plant-wide handling system, to simple hand-pushed monorail carrier, Louden's longest experience and competent engineering will best meet your needs.

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A Subsidiary of Mechanical Handling Systems, Inc.

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Whatever your job . . . whatever your problem . . . Murray-Way automatic equipment will do that job better and more economically.

These are just a few illustrations of Murray-Way's success in beating production cost with the finest automatic equipment available.

You can depend on Murray-Way engineering, Murray-Way experience, Murray-Way equipment to solve your production problems.

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F. #72 Series Belt Polishing Head
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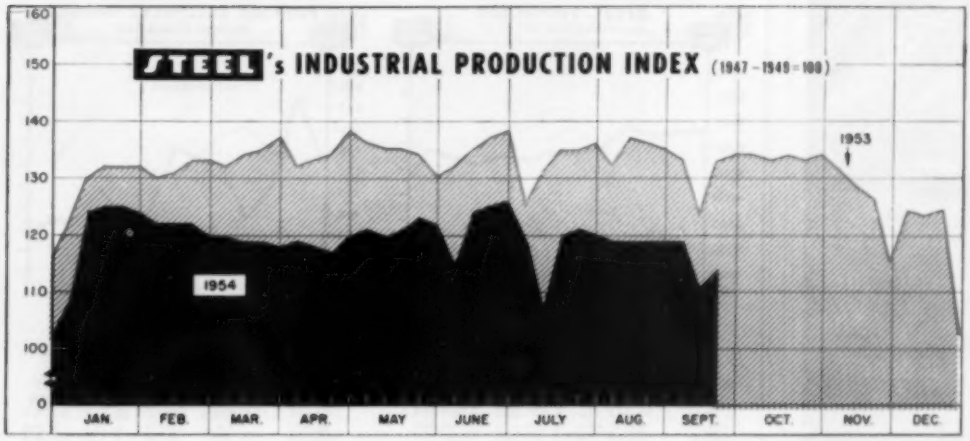

LATEST WEEK*	114
PREVIOUS WEEK	111
MONTH AGO	119
YEAR AGO	134

* Week ended Sept. 18.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

New Order Activity Heralds a Good Fourth Quarter

FOURTH QUARTER, 1954, is like a new car—if it doesn't live up to the sales talk, a lot of people are in for a big disappointment.

But it's a good bet that the coming three months will show just what is expected of them—a slow but steady rise in new orders, production and employment. Only those who expect too much are in for a disappointment.

Sneak Preview—For a quick idea of what STEEL's industrial production index will act like for the rest of the year, take a look at the first quarter. Then turn it over, so the low end is in October. Add a point or two to each week, and you'll have it.

On the threshold of the long heralded "fall upturn," here is how some key industrial components stack up:

New Orders Climb—Reports of increasing new orders are encouraging. A pickup in business traditionally takes place in the fall, but the current rise is more than seasonal—so far. Depleted inventories are helping the trend upward. Manufacturers who let stocks get below "safe" levels are now worrying about missing out on business. So they're dusting off purchase orders.

One place this has been specially noticeable is in steel. An indication of the firming market was the almost negligible drop in output during the Labor Day week end. Another is the lengthening delivery schedules either announced or in prospect for certain items.

'Lighting Up'—Even more tangible evidence of a pickup is offered by Pittsburgh Steel Co. It is putting a blast furnace back in operation. More pig iron is needed to fill orders for hot and cold-rolled sheet.

Another report of climbing new orders comes from American Supply & Machinery Manufacturers' Association Inc. It's new order in-

BAROMETERS OF BUSINESS

	LATEST PERIOD[a]	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,583	1,583	2,144
Electric Power Distributed (million kwhr)	9,025[1]	8,808	8,395
Bitum. Coal Output (daily av.—1000 tons)	1,108	1,275	1,353
Petroleum Production (daily av.—1000 bbl)	6,160[1]	6,178	6,495
Construction Volume (ENR—millions)	$306.4	$220.7	$321.0
Automobile, Truck Output (Ward's—units)	73,100	84,743	146,912
TRADE			
Freight Car Loadings (unit—1000 cars)	650[1]	602	824
Business Failures (Dun & Bradstreet, no.)	174[1]	168	182
Currency in Circulation (millions)[3]	$29,998	$30,115	$30,335
Dept. Store Sales (changes from year ago)[3]	−5%	+12%	−11%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,894	$13,659	$17,904
Federal Gross Debt (billions)	$274.9	$275.0	$273.3
Bond Volume, NYSE (millions)	$14.5	$10.0	$17.3
Stocks Sales, NYSE (thousands of shares)	10,401	7,398	9,468
Loans and Investments (billions)[4]	$82.7	$82.8	$79.1
U. S. Gov't. Obligations Held (billions)[4]	$35.5	$35.9	$31.5
PRICES			
STEEL's Finished Steel Price Index[5]	194.19	194.19	189.38
STEEL's Nonferrous Metal Price Index[6]	218.2	217.4	203.2
All Commodities[7]	110.0	109.9	110.8
Commodities Other Than Farm & Foods[7]	114.5	114.5	114.6

[a]Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,354,549. 1953, 2,254,450. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

Your machining department for hardened and precision ground screw machine products. Send for brochure & equipment list.

Ottawa

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Grand Haven Michigan

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"Hotel Cleveland, sir?"

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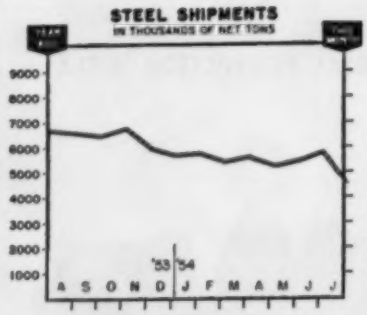
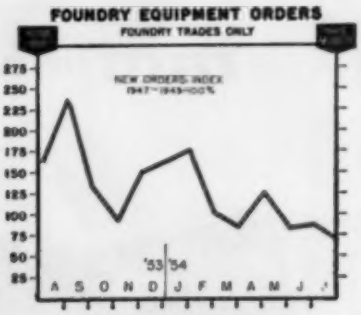
BOSTON: Hotel Somerset
NEW YORK CITY: Ritz Tower Hotel
CLEVELAND: Hotel Cleveland

THE BUSINESS TREND





	Net Tons		
	1954	1953	1952
Jan.	5,727,600	7,067,636	6,589,193
Feb.	5,364,978	6,533,227	6,358,293
Mar.	5,583,690	7,436,919	6,490,391
Apr.	5,287,972	7,162,460	5,922,173
May	5,423,168	7,209,396	5,947,450
June	5,887,489	6,950,059	1,250,243
July	4,490,179	6,582,513	1,413,672
Aug.	.....	6,498,605	6,312,119
Sept.	.....	6,400,757	6,542,147
Oct.	.....	6,726,850	7,155,611
Nov.	.....	5,903,980	6,647,725
Dec.	.....	5,684,920	7,105,383

American Iron & Steel Institute.

Charts copyright 1954 STEEL.

	Index (1947-1949=100)		Value Thousands	
	1954	1953	1954	1953
Jan.	173.8	99.6	$2,463	$1,419
Feb.	99.9	97.5	1,423	1,388
Mar.	82.7	132.2	1,089	1,882
Apr.	125.3	111.8	1,776	1,592
May	80.9	182.1	1,144	2,594
June	86.4	156.4	1,225	2,227
July	65.8	158.9	974	2,263
Aug.	.....	235.5	.....	3,353
Sept.	.....	127.7	.....	1,819
Oct.	.....	87.1	.....	1,241
Nov.	.....	149.4	.....	2,129
Dec.	.....	160.8	.....	2,290

Foundry Equipment Mfrs. Assn.

dex rose 10 per cent from July to August.

Some of the upturn in steel stems from the auto industry, and this will gain momentum as the model changeover is completed.

Autos Hit Bottom . . .

September marks the low in auto output for the year. Chrysler is just swinging back into action after a changeover that took about a week longer than planned. The corporation wanted about 8000 cars completed by Oct. 1; prospects now are for not much over one-tenth that.

GM and Ford model switches running into October will also hold back September totals. As for independents, the outlook runs from Studebaker, who is already producing 1955 models, to Hudson-Nash and Kaiser-Willys, who won't start on new models much before the first of the year—perhaps even later. Packard has set an early November starting date.

Some car dealers may be caught as they were last year. Sales in August were about 450,000, off 2 per cent from a rather disappointing July. Even if September sales are at the August level, dealers will still have about 100,000 unsold cars on hand. Actual outlook is even worse. Since 1947, only one year (1952) showed an August-September increase in new car registrations.

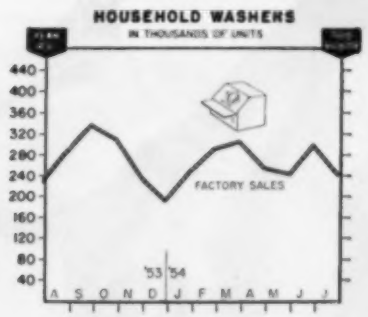
Trailers on a Bumpy Road . . .

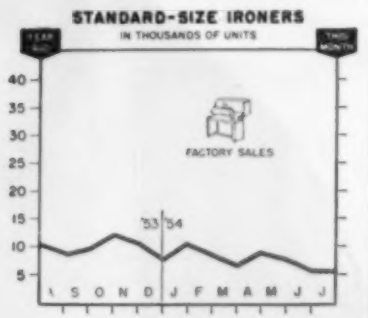
Truckers have their problems, too. So Trailmobile Inc. is trying out a new merchandising gimmick to entice buyers who would like to buy a new trailer but are afraid the business pickup won't arrive soon enough to justify the expense.

Trailmobile's plan in effect gives a truck-trailer operator free use of a trailer for 90 days. Here's how it works: The operator buys a used trailer from Trailmobile. If within 90 days business increases enough, the operator can turn in the used trailer for credit of the full net purchase price on a new trailer.

If the business upturn is late, Trailmobile points out, the operator will have only the low investment in the used trailer and will have no heavy fixed charges.

Judging from sales thus far in 1954, the trailer business can use some sort of stimulant. On a monthly basis, industrywide sales





Sales Billed—Units

	1954	1953	1952
Jan.	249,956	277,309	213,998
Feb.	295,171	226,604	255,584
Mar.	307,862	345,989	248,431
Apr.	258,712	288,474	217,211
May	246,944	286,515	213,689
June	303,455	304,086	274,457
July	242,863	228,289	207,593
Aug.	.....	291,280	254,537
Sept.	.....	340,332	283,732
Oct.	.....	310,867	327,814
Nov.	.....	238,153	293,079
Dec.	.....	191,570	310,661
Totals	.....	3,429,627	3,101,045

American Home Laundry Mfrs. Assn.

Factory Sales—Units

	1954	1953	1952
Jan.	9,792	24,395	15,436
Feb.	8,205	22,586	17,630
Mar.	6,025	16,066	13,913
Apr.	5,388	14,040	8,934
May	7,210	9,323	12,452
June	5,185	12,529	17,654
July	5,227	9,626	15,025
Aug.	.....	8,067	16,177
Sept.	.....	9,113	22,102
Oct.	.....	11,666	25,204
Nov.	.....	10,105	19,724
Dec.	.....	6,903	16,798
Totals	.....	154,464	202,143

American Home Laundry Mfrs. Assn.

are about 50 per cent under a year ago. One part of the business has picked up, though, and that's in aluminum trailers where shipments are running from 2 to 3 times over those of a year ago. In 1952 sales of aluminum vans were hardly noticeable. Steel remains king by about 3 to 1, but with truckers getting increasingly weight-conscious, the light metal is a strong competitor and will get stronger.

Patterns: Good and Bad . . .

One industry that is practically assured of a good fourth quarter is electric power. Week after week in the third quarter saw new records set. Record and near-record levels will be maintained until year end, if past years are a guide. The pattern has been for rising output in fourth quarter, with a high week for the year reached in mid-December. Rising industrial production should keep 1954 on a similar track.

Loading of revenue freight, another business barometer, may break precedent in the coming three months. Normal for the past few years has been a peak in September, followed by a steepening slide as the year ended. If that happens in 1954, railroaders will have even more to worry about than they do now.

Loadings are off about 100,000 cars a week. Revenues are off about 15 per cent, while costs are off only about half of that. Any further drop could be a serious blow to many roads. But if the rest of the economy acts as expected, the railroads should get a share of the increased activity.

Encouraging, too, are new orders for freight cars. In spite of higher deliveries in August, backlog increased for the first time in about two years. It's still far under a year ago and less than one-tenth of the postwar peak.

Trends Fore and Aft . . .

The electronics industry paints a rosy picture for color TV. Some spokesmen predict the public will have spent $2 billion for color sets by 1957. That figures out to over 4 million sets. For comparison, this year's production of black and white sets will be about 5.5 million; last year's was 7.2 million . . . Retailers expect record sales for the rest of 1954. The total for the year could exceed 1953. So store buyers are starting to follow the lead of consumers, loosening purse-strings.

FLAT-ROLLED METAL

To Save Time, Trouble and Money

KENILWORTH offers the flat-rolled metal user all the advantages the housewife enjoys when she shops at her favorite super market.

He can do all his flat-rolled buying with one telephone call or by seeing one salesman . . . it takes only one order, there's only one delivery to handle and one check pays the bill. He frees himself of all the inconveniences, waste of time and added costs of doing business with several sources . . . and he never has to worry about having the material when he needs it.

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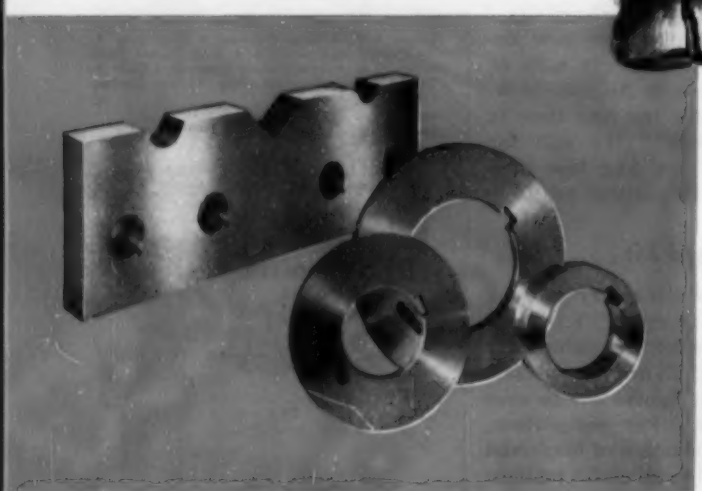

Many leading plants make Heppenstall their standard specification for shear knives. Heppenstall's record for durability provides such production advantages as:

- **MORE CUTS BETWEEN GRINDS**
- **MORE UNITS PER BLADE**
- **LOWER OVERALL BLADE COST**
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The reasons may be found in Heppenstall's high standards for the development and manufacture of shear knives. Made from high quality, electric induction steels, these long-lasting knives are famous wherever hot and cold, ferrous and non-ferrous metals are cut and sheared.

Make Heppenstall *your* standard specifications.

Heppenstall

The most dependable name in forgings

PITTSBURGH 1, PENNSYLVANIA

Sales offices in principal cities

PHILIP O. GEIER JR.
. . . sales mgr. Cincinnati Milling Products

Philip O. Geier Jr. was appointed sales manager, **Cincinnati Milling Products Division,** Cincinnati Milling & Grinding Machines Inc., Cincinnati. He has been associated with Cincinnati Milling for over 15 years and with the products division for the last three and a half years.

Duncan C. Menzies was elected president, general manager and a director of **Servel Inc.,** Evansville, Ind. He succeeds **W. Paul Jones** who becomes vice chairman of the board. Mr. Menzies is vice chairman of the executive committee and a director of **Ball Bros. Inc.** He was executive vice president and general manager of that company from 1950 until June of this year.

Eugene Mowlds Jr. was made general contracting manager of U. S. Steel Corp.'s **American Bridge Division,** Pittsburgh, and **Marion Chapman** was named assistant general contracting manager.

Russell B. Robins joins **L. A. Young Spring & Wire Corp.,** Detroit, as director of marketing and merchandising. He was with Ford Motor Co.'s tractor and implement division where he served as assistant general sales manager.

Edward T. Rudman was named chief plant engineer, **Graton & Knight Co.,** Worcester, Mass.

ROBERT B. HEPPENSTALL JR.
. . . heads Heppenstall plant

Robert B. Heppenstall Jr. was named general manager of the Bridgeport, Conn., plant of **Heppenstall Co.** He succeeds the late **Alfred J. Porter.** Mr. Heppenstall has been market research manager since 1953.

John R. Bremer was made general supervisor of materials, **SKF Industries Inc.,** Philadelphia. He continues as assistant purchasing agent, a post he has held since 1951.

Warren Foundry & Pipe Corp., New York, appointed **Frederick R. Gruner** vice president in charge of operations. He formerly was with Allis-Chalmers Mfg. Co.

R. W. Sykes was named sales manager of the newly created metal buildings division, **Inland Steel Products Co.,** Milwaukee. **Lon S. Shealy** will be assistant sales manager. Mr. Sykes continues as manager of the company's contract sales division.

B. T. Roe was elected vice president, **Detroit Brass & Malleable Co.,** Detroit. He was formerly vice president, Edgewater Steel Co., Pittsburgh.

Gunnar Hurtig Jr. was made sales manager, **Squier Corp.,** Buffalo, a subsidiary of Buffalo Forge Co. He was formerly with Fulton Iron Works, St. Louis.

EDWARD R. MADDOCK
. . . Worthington's Ala. works mgr.

Edward R. Maddock succeeds **George P. Passmore** as works manager of **Worthington Corp.'s** Decatur, Ala., Works. Associated with the firm for many years, Mr. Maddock became product manager of condensers, heaters and ejectors in 1953. Mr. Passmore resumes duties as assistant to the vice president-manufacturing after temporary assignment at the Decatur Works.

Frank M. Harbison was made manager of sales, warehouse division, **Jones & Laughlin Steel Corp.,** Pittsburgh. **Robert W. Walsh** was named to the newly created position of sales manager, New York warehouse. **Chauncey K. Hubbard** was made general manager, container division, New York, to succeed **F. T. Barton,** recently named vice president-special products and services for the company.

Paul H. Mougey was placed in charge of aluminum pigment sales in **Aluminum Co. of America's** New York and Newark, N. J., sales offices.

Following resignation of **Walter D. Steele** as president of **Benjamin Electric Mfg. Co.,** Des Plaines, Ill., the following elections are announced: **Hoyt P. Steele,** president; **C. F. W. Alfvin,** vice president-treasurer; **R. Allen Benjamin,** secretary; **J. H. Fall III,** vice presi-

PRICE BERRIEN
. . . joins National Screw Mfg.

J. B. SEWELL
. . . Garlock general sales mgr.

R. W. POWELL
. . . gen. sales mgr., H-P-M machinery div.

dent-general sales manager; **G. A. Hamm**, controller-assistant secretary.

Price Berrien joins **National Screw & Mfg. Co.**, Cleveland, as general plant manager. He formerly was plant manager in Los Angeles for Russell, Burdsall & Ward Bolt & Nut Co.

Olin Mathieson Chemical Corp., New York, formed Aug. 31 by merger of Olin Industries Inc. and Mathieson Chemical Corp., announces elections: **John W. Hanes**, chairman of the finance committee and vice president-finance; **F. Stillman Elfred, John C. Leppart, Stanley De J. Osborne**, executive vice presidents. Named vice presidents for operations are **N. H. Collisson, D. W. Drummond, R. L. Hockley, M. F. Meissner, S. L. Nevins** and **J. J. Toohy. Russell Hopkinson** is vice president-development; **Robert W. Lea**, vice president-organization; **R. B. Lewis**, vice president-financial analysis; **David T. Marvel** vice president-sales; **Fred Olsen**, vice president-research; and **Ralph A. Ostberg**, vice president-production.

Raymond G. Tessmer, former chief engineer, is now vice president-engineering of **Louis DeMarkus Corp.**, Buffalo.

James A. Robertson, plant metallurgist for **Toledo Steel Tube Co.**, Toledo, O., has been assigned to the sales department.

J. B. Sewell was made general sales manager, effective Oct. 1, of **Garlock Packing Co.**, Palmyra, N. Y. He assumes duties of **Louis Mohn**, a vice president, who is on leave of absence. Mr. Sewell has been vice president of Garlock Packing Co. of Canada Ltd.

John E. Fries Jr. was made chief metallurgist of **American Brake Shoe Co.'s** National Bearing Division. He is located at the Meadville, Pa., plant where he formerly was plant metallurgist. **Edward R. Anderson** was elected a vice president of the company and continues as president of the Am-Forge Division in Chicago.

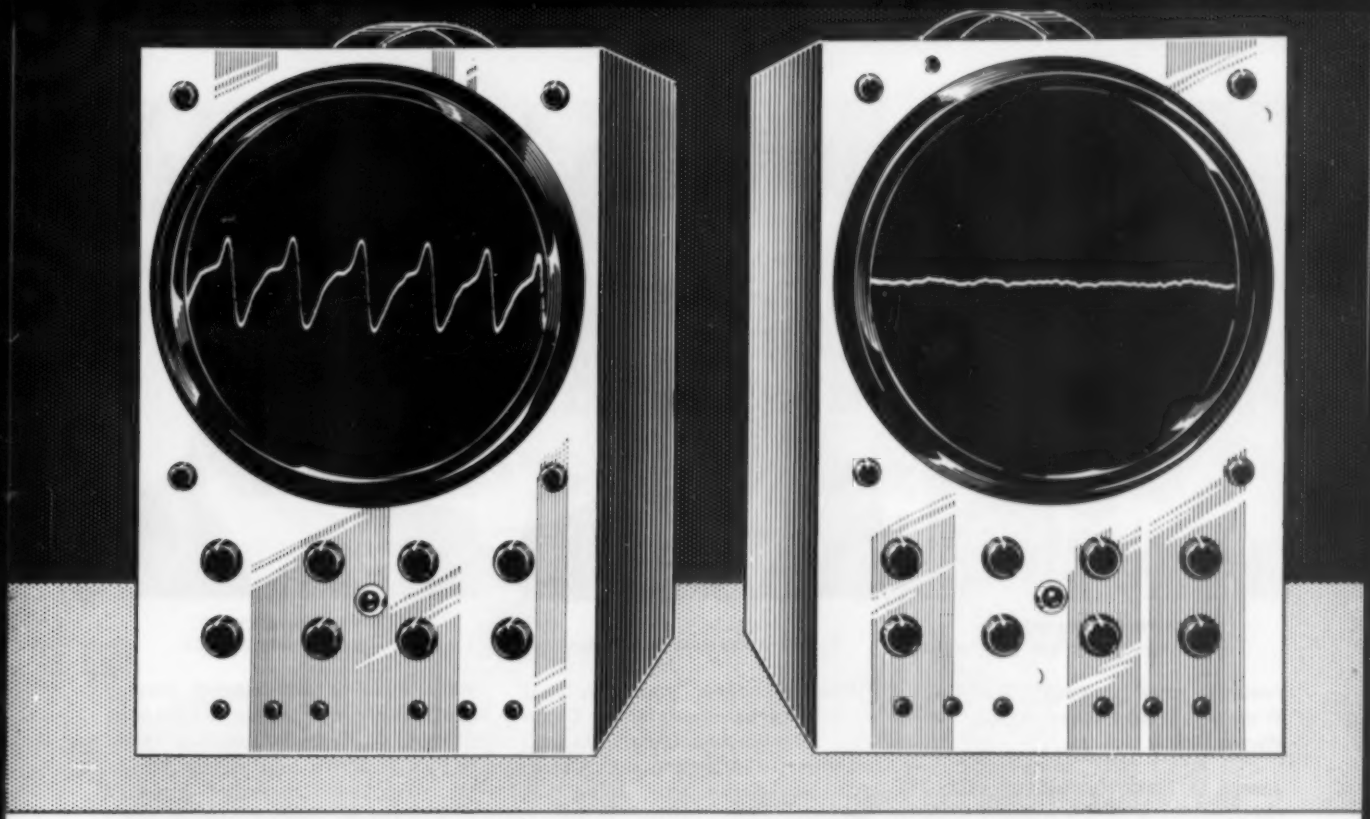
Hydraulic Press Mfg. Co., Mt. Gilead, O., appointed **R. W. Powell** general sales manager of its machinery division. It includes the metalworking and process press division, the plastics machinery division (of which he had been sales manager) and the die casting machinery division.

Ross Miller was named sales manager, St. Paul Hydraulic Hoist Division, Mattoon, Ill., **Gar Wood Industries.** He previously was vice president and general manager, National Lift Co. **B. F. Whitbread** was made product sales manager for hydraulic hoists and dump bodies and **Harold C. Clark**

JOHN E. FRIES JR.

EDWARD R. ANDERSON

. . . American Brake Shoe appointments



WHEN A STRAIGHT MINERAL OIL was used to lubricate the ways, an 0.0008" jump at frequency of 2.74 cycles per second was noted.

WHEN SUNOCO WAY LUBRICANT was used on the ways, the jump was too small to measure, proof that this medium stops slip-stick motion.

TEST PROVES SUNOCO WAY LUBRICANT ENDS SLIP-STICK TABLE MOTION

How effectively Sunoco Way Lubricant stops slip-stick table motion is graphically illustrated by these oscillograms. The pattern on the left was made with a straight mineral oil as the lubricant; the other was made with Sunoco Way Lubricant on the ways. Both patterns are magnifications of changes in rate of table travel and were obtained under identical conditions.

You can stop slip-stick table motion, protect the ways, get better surface finishes, cut production losses with Sunoco Way Lubricant. Try it in your shop. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-9.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

SUNOCO®

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of the famous Blue Sunoco Gasoline and Dynalube Motor Oils

JOSEPH R. SCHAEFFER
. . . chief eng., Blaw-Knox construction

CLAYTON L. JONES
. . . Morse Chain master mechanic

MARC BENDICK
. . . heads Barnaby Mfg. Co.

product sales manager for Gar Wood's Load-Packer line at Wayne, Mich.

Joseph R. Schaeffer was appointed chief engineer of **Blaw-Knox Co.'s** construction equipment department, and **R. A. McCullough** was made assistant chief engineer. The department is located at Blawnox, Pa.

John R. Warner Jr. was named manager of purchases by **Bucyrus-Erie Co.**, Milwaukee.

D. H. Prutton becomes board chairman and **Howard D. Prutton** president of the reorganized **Prutton Corp.**, Cleveland, formerly named D. H. Prutton Machinery Co.

Kobe Inc., Huntington Park, Calif., named **W. F. Slater** general sales manager, **R. G. Ralph** hydraulic service manager, **Ray Elner** hydraulic sales manager and **J. T. Lewis** southern division sales manager.

Clayton L. Jones was appointed master mechanic of **Morse Chain Co.**, Borg-Warner Corp. He will headquarter in the company's main office in Detroit. Mr. Jones was formerly vice president-manufacturing for Hage Industrial Corp.

Sydney Minault was promoted to works manager, **National Research Corp.**, Cambridge, Mass., responsible for both the production and engineering departments of the equipment division. He is replaced as manager of engineering by **William O'Malley.**

Harold F. Marsh was elected president of **General Manufacturing Co.**, Detroit.

Warren I. Higgins was promoted from assistant treasurer to executive vice president of **Merrill & Usher Co.**, Worcester, Mass. **William C. Keel** was named sales manager, eastern district; **James S. Kenary** sales manager, western district.

Marc Bendick was elected president, **Barnaby Mfg. Co. Inc.**, Bridgeport, Conn. **Barnabus Toth** retires as active head of the firm. Mr. Bendick recently headed Bridgeport Industries. He is also associated with McIvers Oil Co., San Antonio, Tex., and, in addition, operates the Neo Engineering Co., Bridgeport, designer and builder of special tools and equipment. Other elections include **Jack Stock**, treasurer; **Louis F. Kutscher**, sales manager; and **Harold Saunders**, superintendent.

William F. Wilson was elected vice president in charge of engineering and manufacturing for **Gear Grinding Machine Co.**, Detroit. He formerly served as works manager.

George S. Chairamonte, Horton Chuck Division sales manager, was appointed to the new position of general sales manager, **E. Horton & Son Co.**, Windsor Locks, Conn.

OBITUARIES . . .

Paul Mackall, 68, who retired in 1953 as vice president in charge of sales, **Bethlehem Steel Co.**, Bethlehem, Pa., died Sept. 16.

Benjamin Scott, 60, superintendent, hot strip and blooming mills, **Jones & Laughlin Steel Corp.**, Cleveland, died Aug. 31.

H. W. Hoover, 77, honorary chairman of **Hoover Co.**, Canton, O., died Sept. 16. He resigned as president in 1948, continuing as board chairman. He became honorary chairman last year.

Joseph F. Brehl, 47, sales engineer at **National Alloy Division**, Blaw-Knox Co., Pittsburgh, died Sept. 2.

Hyman Goldburg, 52, director of sales and service, **Parker-Kalon Division**, General American Transportation Corp., New York, died Sept. 1.

Chester A. Blackburn, retired vice president and director of manufacturing, **Perfection Stove Co.**, Cleveland, died Sept. 12.

Victor A. Hanson, vice president-general manager, **Precision Gear & Machine Co. Inc.**, Charlotte, N. C., died Aug. 13.

Paul J. Gleason, 52, in charge of plant engineering, automotive division, **Willard Storage Battery Co.**, Cleveland, died Sept. 9.

Another Duplex Milling Machine

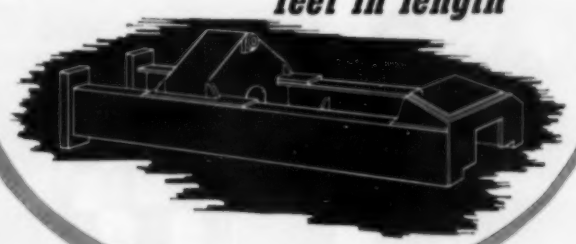
BY MOTCH & MERRYWEATHER

Fifty Years 1904 - 1954

STANDARDIZED TRAVELING HEAD DESIGN is adapted to *Many Specialized Jobs*

A Motch & Merryweather Duplex Milling Machine finishes the pads of an 8-foot tractor frame. A second frame (rear) is loaded while the first frame (front) is milled.

... especially for Large Parts 6 feet to 11 feet in length



Again using the facility of *traveling milling heads* instead of traveling fixtures, Motch & Merryweather creates greater universality; saves time, original cost and floor space. Standardized design enables duplex operation to dispatch a wide range of work with money-making speed and accuracy. Simplified fixturing is readily adjustable to handle parts of varying size. May we study your requirements?

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, also Production Milling, Turning, and Special Machines

Only the Wiggins Gasholder*

has the dry fabric seal that

eliminates maintenance problems!

Write for information

WIGGINS VAPOR SEALS
GENERAL AMERICAN
TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street
Chicago 90, Illinois

* PATENTED

Minex Uncovers Zinc Ore

Assays of deposits found at Meat Cove, Nova Scotia, run up to 36 per cent zinc

DEPOSITS of high-grade zinc discovered at Meat Cove on the northern tip of Cape Breton, Nova Scotia, brighten the prospect of solving the economic problem created by the decline in coal mining there.

Finds were made by Mineral Exploration Corp. Ltd., Toronto, Ont., with assays "running up to 36 per cent zinc." This high-grade ore, when added to the large indicated tonnages of low-grade ore reported in August, suggests two possibilities: A large medium-grade deposit in this section of Nova Scotia or a profitable high-grade one, says Norman Vincent, president.

Heavy Concentration — Officials of the firm estimate the ore body to represent over 15,000 tons per vertical foot for the over-all area, including 5000 tons per foot in the smaller, richer section, with possibility of extensions. Where diamond drilling has been done, it has shown zinc mineralization at depths of 250 to 300 feet below surface outcrops of ore.

Assays of the lower-grade ore showed a content of germanium.

McLouth Buys Mill Equipment

More than $4 million worth of electrical equipment for McLouth Steel Corp.'s new cold strip mill expansion at its Gibraltar, Mich., plant will be supplied this year and next by General Electric Co., Schenectady, N. Y. The largest and most important mill in the expansion project will be a four-stand tandem unit. It will change a ¼-mile long, ⅛-in.-thick strip into a strip 1 mile long, 1/32-in. thick every four minutes. The output will be processed further in annealing furnaces, two skin pass mills, two shearing lines and two slitting lines. Nearly all of the product will be destined for use in automobile bodies.

Bede Products Corp. Formed

U. S. Automatic Corp., Amherst, O., manufacturer of screw machine products and industrial equipment, formed Bede Products Corp. as a wholly owned subsidiary. The new firm has acquired exclusive manufacturing and sales rights of Bede products, including paint heaters and a spray painting unit.

Carmody Corp. Organized

Carmody Corp. was organized in Buffalo to engineer and manufacture new kinds of training devices for the armed forces. The firm, capitalized at $296,000, has leased space at the Buffalo airport. Founder and president is Edmond O. Carmody, formerly with Link Aviation Co. and Stanley Aviation Corp.

Instrument Firm Changes Hands

American Chain & Cable Co., Bridgeport, Conn., purchased virtually all of the capital stock of Bristol Co., Waterbury, Conn., maker of industrial instruments, including automatic mechanical and electronic controls.

Ramhawk Opens Office

Ramhawk Industries Inc. opened an office at 1 E. 53rd St., New York 22. The company has obtained exclusive U. S. sales rights for European machine tools, including pear pantographs manufactured by Meccaniche A. Pecchioli, Florence, Italy.

Atlas Steel Builds Warehouse

Atlas Steel Ltd., Welland, Ont., will occupy its new warehouse and office at 459 Burlington St., Hamilton, Ont., by November. The new facilities will quadruple the company space in that city and will house six times the quantity of specialty steels available in the former location.

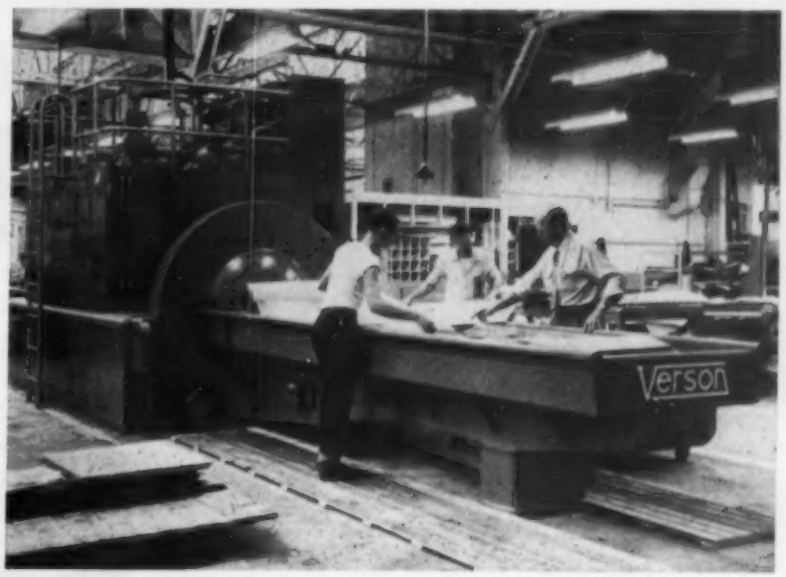
Offers Water Treatment System

C. C. McMillan Industrial Supplies was organized in Portland, Oreg., to manufacture Kemaloid. The product was developed to remove and prevent scale, corrosion, oil deposits, foaming and priming and embrittlement tendencies in boilers and cooling water systems.

Linde Takes Over Oxweld Line

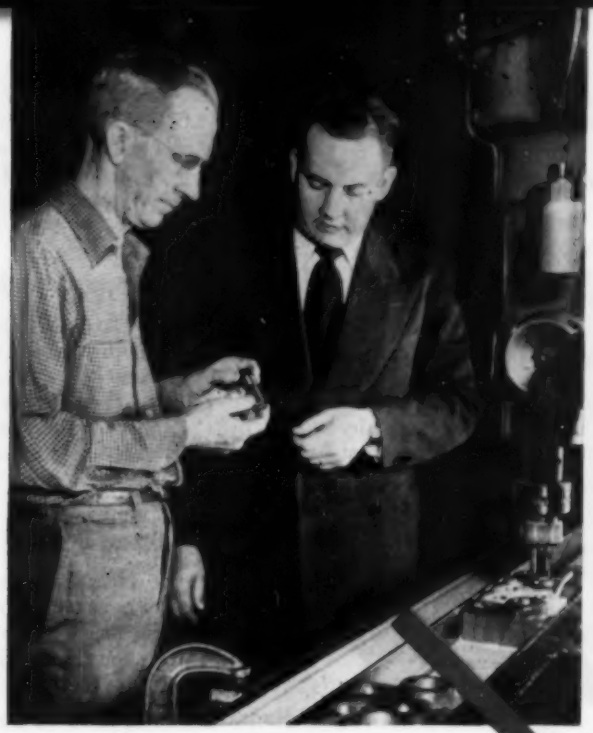
Linde Air Products Co. formed a railroad department that will conduct the business previously handled by Oxweld Railroad Service Co. Both are divisions of Union Carbide & Carbon Corp., New York. The new department

(*Please turn to page* 72)



Big Squeeze Gets New Look

This Verson-Wheelon press, installed at Northrop Aircraft Inc., Hawthorne, Calif., for use on the Scorpion F-89D and Snark B-62 guided missile, exerts 19,440 tons of pressing force. In operation, the fluid bag of the modified rubber pad press is inflated up to a maximum of 7500 pounds per square inch



● Much more than mere salesmen, Standard's lubrication engineers are "Johnny-on-the-spot" when it comes to checking performance, offering advice on new products and otherwise being helpful. Here is J. E. Meyer, Jr. at work in the Trane Company plant. *You* can have advice and service like this. Call your nearby Standard Oil office or write: Standard Oil Company, 910 S. Michigan, Chicago 80, Ill.

the thread of this story depends on..

SUPERLA
REG. U. S. PAT. OFF.
Soluble Oil

● The coils manufactured by the world-famous Trane Company in La Crosse, Wisconsin are the heart of the heating and cooling equipment manufactured by this company. Threaded cast iron headers are used in many of these coils. The job requires cleanly threaded, cleanly finished holes that must be absolutely rust-free to assure maximum trouble-free operation.

Up to 1936, various soluble oils had been tried but none was successful in eliminating work spoilage due to rusting. On the advice of a Standard Oil lubrication specialist a switch to SUPERLA Soluble Oil was made with marked success.

Rejections due to rusting threads have been completely eliminated. At the same time, the quality of the threads has been excellent. In addition working conditions have also been greatly improved—with SUPERLA on the job, there's been no odor development, no gumming up of machines.

SUPERLA Soluble Oil can help you find a happy solution to your lubrication problem. SUPERLA forms stable emulsions . . . helps provide good finish and tool life and has superior rust prevention properties. Call your Standard lubrication specialist today and find out how he can help you.

STANDARD

STANDARD OIL COMPANY
(Indiana)

(*Concluded from page 69*)
will serve railroads by selling gases, apparatus, carbide and supplies for welding and cutting. K. I. Thompson is department manager.

Enameling Unit Installed

Ferro Corp., Cleveland, completed a furnace modernization program at RCA Estate Appliance Corp.'s range plant, Hamilton, O. The installation provides the corporation with facilities for porcelain enameling gas and electric kitchen range products.

Steel Door Company Expands

Arcadia Metal Products, Arcadia, Calif., expanded facilities for increased production of steel sliding doors.

Production Schedules Revamped

Production of jet engine blades will be transferred from Frigidaire Products of Canada Ltd.'s plant in Leaside, Ont., to A. V. Roe Canada Ltd.'s plant in Malton, Ont. Space freed at the Leaside plant will be used to expand Frigidaire's line of home and industrial appliances.

Inductotherm Corp. Organized

Inductotherm Corp. has been organized to design and manufacture melting and heating equipment. Headquarters are at 620 E. Glenolden Ave., Glenolden, Pa. Principal officers are Henry M. Rowan and Paul F. Foley.

Zagar Tool Opens Branch

Zagar Tool Inc., Cleveland, established a branch office at 610 W. Michigan Ave., Milwaukee. E. A. Domin is branch manager.

Hamilton, Ont., Firm To Build

Mills Scaffold & Concrete Specialties Ltd. plans to erect a factory in Hamilton, Ont. The firm will manufacture engineers' keys, pins, other fastenings and items for the construction industry.

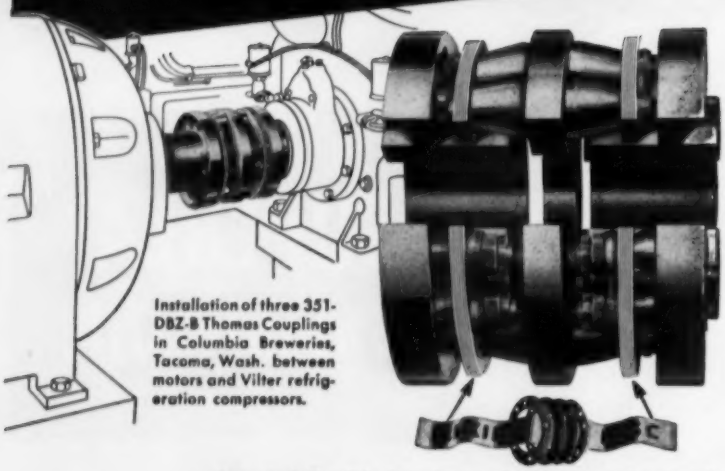
Glen Alden Buying Equipment

Glen Alden Coal Co., Scranton, Pa., is engaged in a $1.4-million mine mechanization program. Through 12 months ended July 31, the firm had spent $700,000 of this amount, with the remaining $700,000 authorized for expenditure during the remainder of 1954. Funds are being used for the purchase of machines and equipment, such as continuous miners, shuttle cars, high-speed cutting machines, loading machines and surge elevators.

Austenal Opens New Facility

The new alloy-making unit of Austenal Laboratories Inc., Chicago, is in full operation at its Dover, N. J., plant. The facility consists of a 10,000-sq-ft building, furnished with casting, shotting and other alloy producing equipment. On a single shift, the firm's potential capacity for shot alloy now runs at 30,000 lb per week. The new unit is adjacent to the Microcast production plant, now covering 55,000 sq ft of the 43

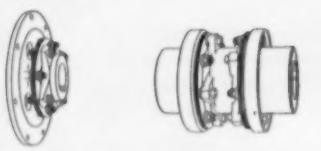
THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



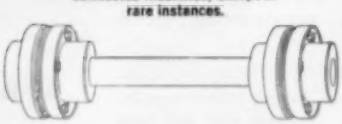
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACES	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

a hole here makes waste...

a hole here makes a saving

Crucible Hollow Tool Steel Bars **are a boon to the metalworking industry. The hole in these quality bars enable toolmakers to eliminate drilling, boring, cutting-off and rough-facing operations. This cuts production time, boosts machine capacity and saves scrap losses.**

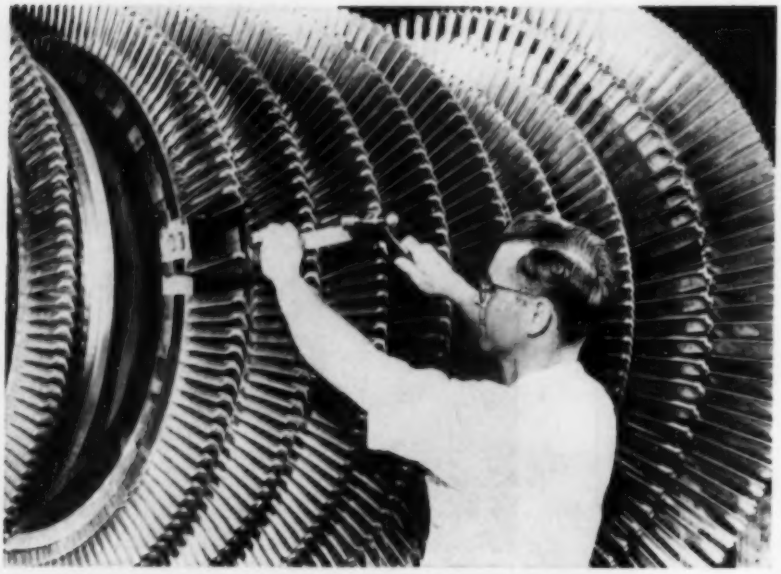
They are available now, in any of Crucible's famous tool steel grades, in almost any combination of O.D. and I.D. sizes. And you can get *immediate* delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high carbon-high chromium, AIRKOOL air-hardening, and NU DIE V hot-work tool steels — from a conveniently located Crucible branch warehouse.

Let your Crucible representative show you how these steels can best help *you*.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **HOLLOW TOOL STEEL**

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.



Another Power Boost for Southwest Texas

A worker at General Electric Co.'s turbine factory, Schenectady, N. Y., assembles buckets near the notch opening on the turbine wheel of a 156,250-kw steam turbine-generator, scheduled to be shipped to Houston Lighting & Power Co.'s Deepwater station. More than 5000 precision-tooled buckets are fitted on the dovetailed turbine wheels. This is the seventh GE turbine to be installed in the plant, another major step in the company's current expansion program

acres of ground purchased in 1949 when the original investment casting plant was started.

Toronto Firm Changes Hands

John Brown & Co., Sheffield, England, purchased control of A. C. Wickman (Canada) Ltd., Toronto, Ont., manufacturer of special machine tools, dies, gages and other equipment.

B-L-H Transfers Salesmen

Baldwin - Lima - Hamilton Corp. announces that hydraulic press and testing equipment salesmen formerly attached to the New York district office are operating directly from headquarters at Eddystone, Pa.

LeTourneau Forms New Division

R. G. LeTourneau Inc., Longview, Tex., organized a Steel Products Division that operates as a separate facility. The division incorporates all the firm's steel mill operations at Longview and will expand production of steel plate, plate shapes and fabricated structures. Harry S. Clark is general manager. Succeeding him as general manager of the Texas Division is James M. Molpus, who, in turn, is succeeded as general manager of the Mississippi Division, Vicksburg, by Ben W. Le Tourneau.

Colson Opens Branch Office

Colson Corp., Elyria, O., maker of materials handling equipment, opened sales offices and warehousing facilities in Union City, N. J., replacing offices in New York and Philadelphia. Colson recently acquired the assets of Service Caster & Truck Corp., Albion, Mich. J. D. Ramsay is district manager in charge of the New York and Philadelphia areas, while H. W. Beers is in charge of Union City operations.

Tapmatic Corp. Building

Tapmatic Corp. completed the first unit of its plant in Costa Mesa, Calif., and is equipping it for manufacture of tapping attachments. The corporation has been in operation for about a year in Banning, Calif. Andrew Johnson is president; Eric S. Johnson, sales manager. They formerly owned Mayville Die & Tool Co., Mayville, Wis., maker of tools, dies, jigs and fixtures.

Plans Fabricating Plant

Horton Steel Works Ltd., Toronto, Ont., plans to construct a $150,000 steel fabricating plant in Lethbridge, Alta.

Will Distribute Machine Tools

J. M. Kalins Inc. has been organized as a machine tool distributing firm with offices at 113 E. Washington Ave., Bridgeport, Conn. Associated with Mr. Kalins is Albert E. Hand, a specialist in deep drawing and metal fabrication.

Wayne Pump Buys Ohio Firm

Schirmer-Dornbier Pump Co., Cleveland, manufacturer of rotary pumps for industrial and service station equipment, has been acquired by Wayne Pump Co., Salisbury, Md. No change in plant location or personnel at Schirmer will be made, says W. H. Bateman, president of Wayne Pump.

Keokuk Firm Buys Skidmaker

Thomas Truck & Caster Co., Keokuk, Iowa, purchased Lanham Co., Louisville, and will operate it as a division under the name of Lanham Skid Co. The latter firm makes skid platform and allied products. The purchaser manufactures industrial trucks, trailers, casters and wheels. Construction of a building in Keokuk to expand the present Thomas manufacturing facilities and integrate the Lanham machinery and equipment is under way.

Warehouse Speeds Deliveries

A warehouse just completed by Diebold Inc., Canton, O., reduces delivery time of its products, saves factory space and improves operations. The gimmick: Production areas are relieved of finished products as fast as they come from assembly lines. Products range

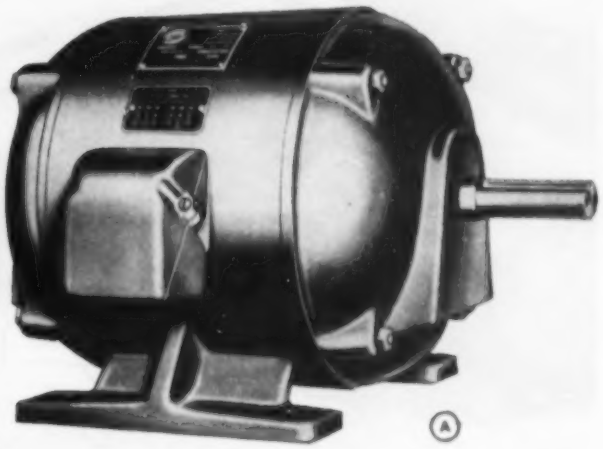
(*Please turn to page 77*)

WHATEVER YOUR POWER REQUIREMENTS

FOR *Original* EQUIPMENT..

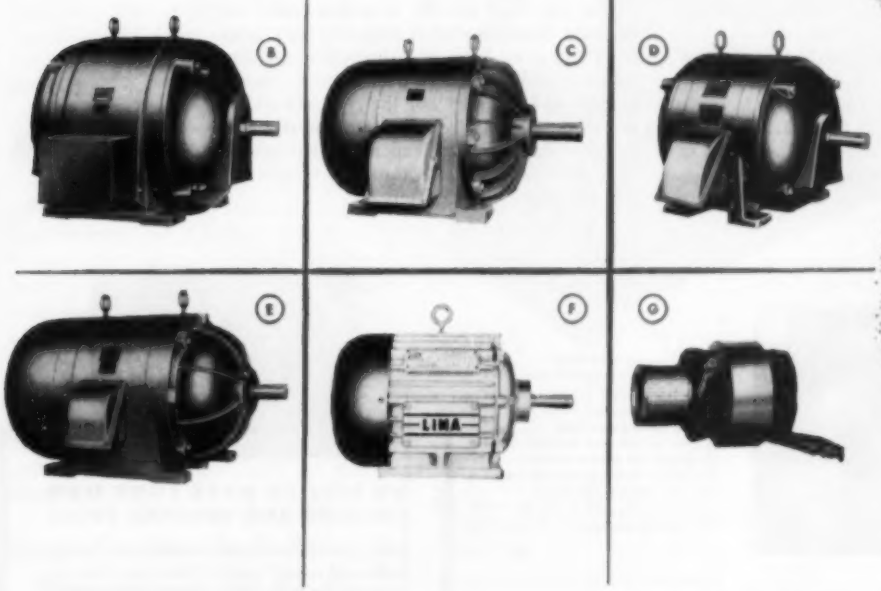
THERE'S A

LIMA



RIGHT FOR THE JOB!

Built-in Dependability
Fast Delivery and Efficient Service



A Lima Type [illegible] totally enclosed, [illegible] ... sizes 83 to 284.

B Lima Type [illegible] ... sizes [illegible] to 365.

C Lima Type [illegible] totally enclosed, [illegible] ... to 326.

D Lima Type [illegible] ... sizes 284 to 405.

E Lima Type [illegible] totally enclosed, [illegible] ... to 445.

F Lima Type [illegible] totally enclosed, [illegible] ... to 326.

Lima Type [illegible] totally enclosed, [illegible] ... sizes 324 to 405.

Lima Type [illegible] totally enclosed, [illegible] ... sizes 324 to 405.

G Lima [illegible] ... [illegible] ...

3 to 150 Horsepower

For complete information, see your local Lima Representative listed in Thomas' Register, MacRae's Blue Book, Conover-Mast Purchasing Directory, or write—

THE LIMA ELECTRIC MOTOR COMPANY, 5186 Findlay Road, Lima, Ohio

Representation throughout the U. S., Canada & abroad

FIRST . . . FOR MOTORS . . . DRIVES . . . GRINDERS

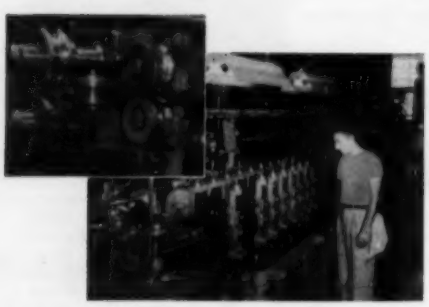
the "Silk Glove" METAL

for forming and bending STAINLESS STEEL

Any job of forming or bending stainless steel must be approached with caution because of the tendency to seize and gall. To eliminate scores and scratch marks in bright finish mouldings and trim for automotive, architectural and home appliance use, Pyramid Mouldings, Inc., Chicago, make their forming rolls and bending fixtures of WW-200 HT.

This miracle aluminum bronze has a hardness of 94 Rockwell B (200 Brinell), and at the same time has an extremely low coefficient of friction. For practical purposes, WW Metal provides a self-lubricating action which effectively prevents scoring and scratching. At the same time, its high hardness and strength make for high resistance to wear, and long tool life.

"Our stainless steel products are mass produced, but high quality and fine finish are essential. Stainless steel is valuable; rejects, rework and scrap losses must be held to the very minimum," says Robert Gielow, tool superintendent at Pyramid. "For the type of work we do, aluminum bronze is the most nearly perfect tool material. And experience has proved to us that WW Metal is the most nearly perfect aluminum bronze."



The ¾" hexagonal tube in the illustration above is made from 0.016" bright finish stainless steel strip. The tube is formed and lock seamed in one pass through an 11-stand mill shown at left. The critical forming operations and the seaming operation are done with rolls made of WW-200 HT Metal.

IT'S EASY TO MAKE YOUR OWN FORMING AND BENDING TOOLS

WW-200 HT Metal is available in centrifugally cast round blanks (illustrated above), rectangular bars, solid rounds, or specially cast shapes. It is fully heat treated, yet it is easily machined with carbide tools. Ask for engineering data on WW Metal aluminum bronzes; better still, tell us about your forming and bending problems and we will recommend the right grades and shapes.

WW ALLOYS, INC.

Division of Fansteel Metallurgical Corporation

11644 CLOVERDALE AVENUE, DETROIT 4, MICHIGAN

Home of Premium Quality Alloy Castings and Forgings

Y542

(*Concluded from page 74*)

from heavy bank vault doors to lightweight steel storage files.

Steel Fabricator To Build

Allied Steel Products Corp., Kenilworth, N. J., will build a $100,000 plant at Cordova, Ala., to fabricate a variety of steel products.

Aluminum Stamping Capacity Up

Schweizer Aircraft Corp., Elmira, N. Y., installed a huge drop hammer to make aluminum stampings. The addition will permit the firm to do more and larger work.

Huge Plant on Stand-by

Michoud Ordnance plant in New Orleans, the Army's Chrysler-managed tank engine production center, is said to be the largest "stand-by" defense manufacturing installation in the United States. The plant's 2400 machines are kept in excellent operating condition, although some highly-specialized laboratory equipment, including some 18,000 gages and precision tools, were moth-balled. The 300 machine tools loaned to supplier firms when Michoud was in full-scale production are being returned for moth-balling and storage.

Haller Inc. Organized

John Haller, formerly vice president in charge of research and engineering at Allied Products Corp., Detroit, organized Haller Inc. in Plymouth, Mich. The firm will handle sales and engineering connected with hydraulic and mechanical presses. In addition to sizing and tabletting presses of Mr. Haller's design, several lines of European presses and other processing equipment will be imported.

Cooper Alloy Foundry Renamed

Cooper Alloy Foundry Co., Hillside, N. J., changed its name to Cooper Alloy Corp. The firm is a large producer of stainless steel cast products, and for many years has been manufacturing special product lines. Just completed is a plant at Clark, N. J., for production of high-alloy rings. Operating divisions are Foundry Products, Valve & Fitting, Aircraft Products and Stainless Engineering & Machine Works.

Black-Clawson Buys Firm

Black-Clawson Co., Hamilton, O., purchased Bagley & Sewall Co., Watertown, N. Y., maker of paper-making machinery. Black-Clawson will operate the Watertown firm as a division.

Mercast Gets British Outlet

Mercast Corp., New York, and Guest, Keen & Nettlefolds Ltd., London, formed a company, Mercast (Great Britain) Ltd., to license the use of the Mercast process to firms in the United Kingdom and the British Commonwealth, excluding Canada. The process: Frozen mercury forms expendable patterns for producing parts by investment casting. Mercast licensees in the United States

(*Pleast turn to page 80*)

The Production-WISE
ROLL FORMING MACHINE

ARDCOR MODEL 1-F

Spindle Diameter	1½"
Roll Diameter	4¼" to 7"
Horizontal Distance Between Spindles	12"
Roll Space on Standard Machine	10"
Capacity Max.	.072

ADAPTABILITY — Ardcor Standard Forming Machines feature "unit construction" for each stand. Thus production changes are easily and quickly made. With this feature, any length base can be furnished to accommodate additional units as required.

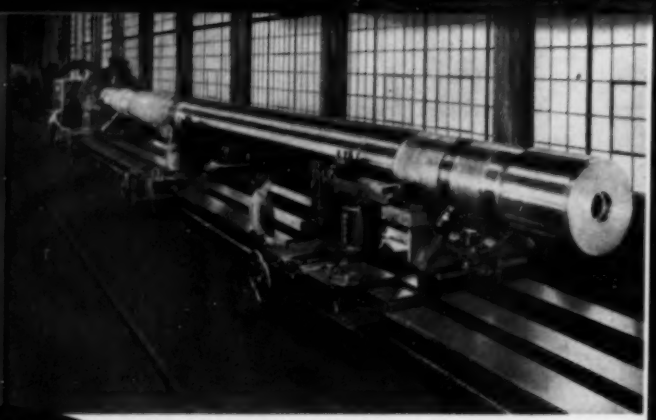
Ardcor Roll Forming machines embody the precision, accuracy and stability found only in the highest grade machine tools. In addition, Ardcor offers a completely engineered installation—cradle reels, roll forming machines, roller dies, flying cut-off fixtures, etc. —from one qualified source.

Likely as not your special shapes can be ideally handled by a standard Ardcor machine. Your inquiry is invited—without obligation.

Machines Available In All Spindle Diameters

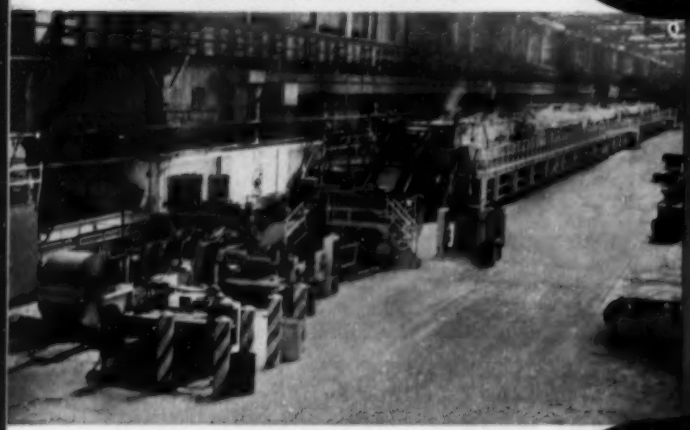
American ROLLER DIE CORPORATION
29520 Clayton • Wickliffe, Ohio

MESTA 60" SHEET SHEARING LINE WITH TRIMMER AND COMBINATION FLYING SHEAR AND LEVELLER

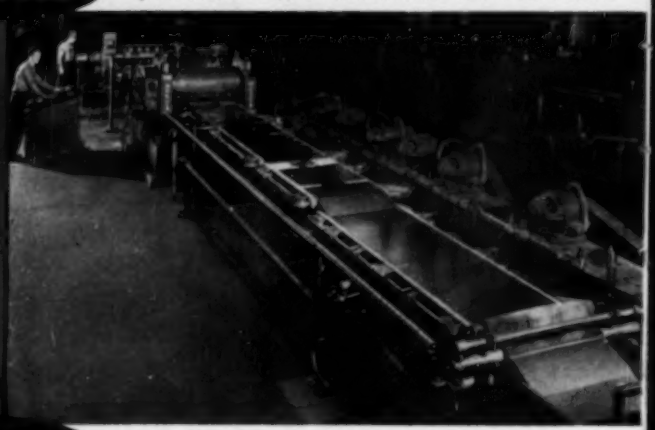


MACHINING FORGED STEEL COLUMN FOR A MESTA 50,000 TON HYDRAULIC PRESS ON A MESTA 96" HEAVY DUTY LATHE

MESTA

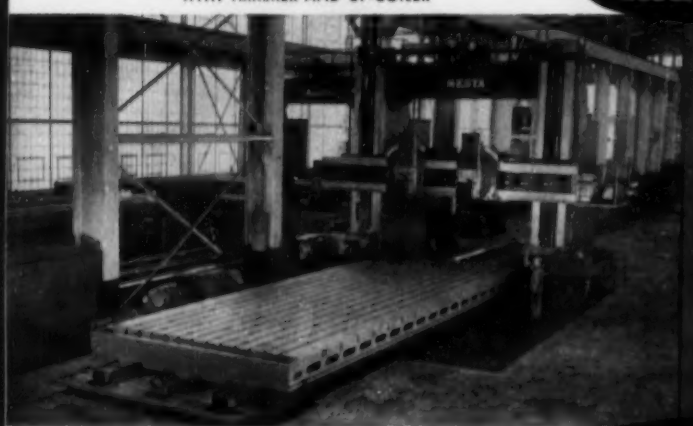


MESTA 60" CONTINUOUS PICKLING LINE WITH TRIMMER AND UP-COILER



MESTA 42" TIN SHEARING LINE WITH TRIMMER AND COMBINATION FLYING SHEAR AND LEVELLER

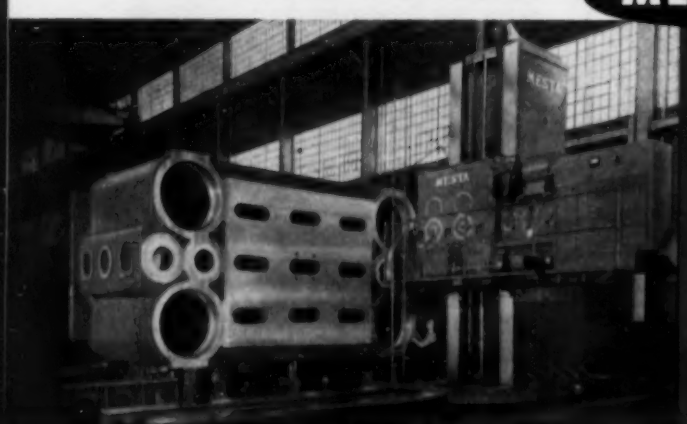
MESTA



MESTA 15' HEAVY DUTY TRAVELING TABLE TYPE PLANER

MESTA 46" TWO-HIGH REVERSING SLABBING-BLOOMING MILL WITH MANIPULATORS AND TABLES

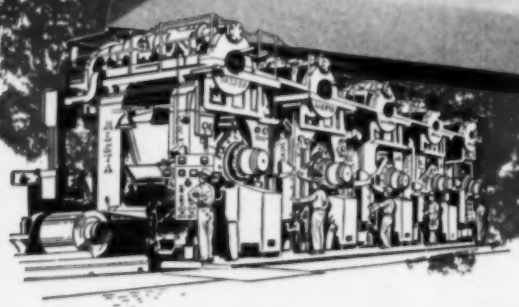
MESTA



MACHINING CAST STEEL BASE SECTION FOR MESTA 50,000 TON HYDRAULIC PRESS ON A MESTA 18" HORIZONTAL BORING AND MILLING MACHINE

MESTA 29" STRUCTURAL MILL WITH TRAVELING TILTING TABLE

Designed and Built by MESTA



Designers and Builders of Complete Steel Mills

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

TWO MESTA 48" CONTINUOUS GALVANIZING LINES WITH FEED REELS, STRAIGHTENERS AND MASH WELDERS

MESTA HEAVY DUTY TRAVELING WHEEL TYPE ROLL GRINDER FINISHING A LARGE MESTA BACKING-UP ROLL

MESTA

MESTA 80" FOUR-HIGH CONTINUOUS HOT STRIP MILL

MESTA 160" FOUR-HIGH REVERSING PLATE MILL

(*Concluded from page 77*)
include Alloy Precision Castings Co., Kolcast Industries Inc. and Thompson Products Inc., all of Cleveland.

REPRESENTATIVES

Taft-Peirce Mfg. Co., Woonsocket, R. I., appointed N. W. Dorr Co., Chicago, as its agent in two areas: Illinois, Chicago, Rockford and Peoria; Indiana, South Bend. Taft-Peirce makes gages, small tools, magnetic chucks and machine tools.

Uddeholm Co. of America Inc., New York, appointed Warren H. Nugent, 621 Free Press Bldg., Detroit, as its representative in Michigan and northern Ohio. At present this territory will be serviced with Swedish tool and die steels and precision cold-rolled strip steels from Uddeholm's New York and Cleveland warehouses.

J. H. France Refractories Co., Snow Shoe, Pa., was named northeastern United States and Canadian licensee for the manufacture of the Walters Loktite checker system for iron and steel industry checkerwork application. H. W. Walters is the designer of the system.

Foote Mineral Co., Philadelphia, named Easton Metal Powder Co. Inc., Easton, Pa., as exclusive agent to market its iron powder RZ40 to the welding industry.

Pioneer Tool Engineering Inc., El Segundo, Calif., producer of cast aluminum tooling and production plates and bars, added several distributors: Meier Brass & Copper Co., Hazel Park, Mich.; Edgcomb Steel Corp., Hillside, N. J.; and Earl M. Jorgensen Co., Oakland, Calif.

Liquid Carbonic Corp.'s Industrial-Medical Gas Division, Chicago, appointed these distributors: Chrismer-Hull Co., Columbus, O.; B & B Air Products Inc., Doylestown Township, Pennsylvania; High Welding Co., Lancaster, Pa.; Triangle Engineering Co., Upland, Pa.; Irish Welding Supply Co., Buffalo; Blackhawk Welding Supply Co., South Beloit, Ill.; Lamb Welding Supply Co., Cedar Rapids, Iowa; Atlas Co., Cincinnati. These companies are distributing a complete line of liquid carbonic arc and gas welding equipment.

Fedders-Quigan Corp., Trenton, N. J., appointed Edward H. Cox Co., Buffalo, and Tomlinson Steam Specialty Co., Cleveland, to sell its heating equipment.

Worker Hits Jack-pot

IDEAS make money.

Westinghouse Electric Corp., Pittsburgh, has just paid a worker $4008 for an idea on building electric generators. It's the third highest award in the history of a suggestion system under which nearly $2 million has been paid to Westinghouse employees since 1910.

B. E. Murphy, the suggester, advised the purchase of extruded aluminum bars that could be cut into proper lengths to serve as wedges. They anchor coils in place on the rotating parts of large turbine generators. Before, wedges were made by machining aluminum bar stock.

Kingston Products Corp.'s Douglas Mfg. Division, Bronson, Mich., appointed John S. Hammond Co. Inc., Greenwich, Conn., as its representative in that area. The division makes mechanical and electrical parts for the automotive, aircraft, farm equipment and electrical appliance industries.

Allis-Chalmers Mfg. Co., Milwaukee, designated Fenton Bros. Electric Co., New Philadelphia, O., as a certified service shop for its motors and controls.

Lodding Inc., Worcester, Mass., maker of standard jig and fixture components, named as its sales representatives Tools Inc., Philadelphia; Robert S. Williams Jr., Towson, Md., for the Baltimore area; J. L. Petz Co., Pleasant Valley, N. Y., for the Poughkeepsie, N. Y., territory.

NEW ADDRESSES

Meridan Corp.'s Flex-O-Tube Division moved into its $500,000 plant at 2525 Jim Daly Rd., Inkster, Mich. The division makes flexible hose assemblies and fittings. The new plant, together with additional equipment, will enable the firm to broaden its product lines within the general field of hydraulics and flexible hose assemblies.

Luna Metal Craft Co. Inc. moved its offices to 127-08 Merrick Blvd., Springfield Gardens 34, N. Y.

Scovill Mfg. Co., Waterbury, Conn., will move its Los Angeles warehouse and sales offices to larger quarters at 6464 E. Flotilla St., effective Oct. 1. Kenneth M. Reid is district manager.

Meier Copper & Brass Co. moved into its new plant at 1471 E. Nine Mile Rd., Hazel Park, Mich. The firm is a distributor for several leading producers of nonferrous metals. In addition, the firm makes a circular saw, designed for cutting of composition and plastic materials and metals.

Kurt Orban Inc. and affiliates have moved their main offices to 34 Exchange Place, Jersey City 3, N. J. Orban is an importer of equipment, iron and steel.

Marcus Transformer Co. transferred its manufacturing operations to an enlarged plant in Rahway, N. J. The firm plans erection of another building within six months for additional manufacturing and storage facilities.

ASSOCIATIONS

Gustav B. Faust, vice-president of Southwestern Engineering Co., Los Angeles, was elected president of **Tubular Exchanger Manufacturers Association.**

Here is perfection!

ROEBLING high carbon wire is unsurpassed for industry today. Roebling wire is absolutely true to specifications ...absolutely uniform in gauge and finish. Manufacturers who try Roebling wire once, become Roebling customers from then on.

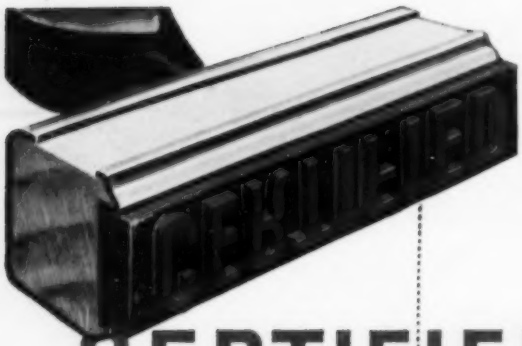
You *pay* for the best when you buy high carbon wire. Make sure that you *get* it! Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

The Jonker, world's largest emerald-cut diamond.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.



NEW AIR-BREAK STARTER for 2,200 to 5,000 Volt Motors features 50,000 KVA Capacity

CERTIFIED

FOR FANS, PUMPS, COMPRESSORS, CONVEYORS, CRUSHERS, AIR CONDITIONING UNITS, MILL MACHINERY

Designed for a wide range of applications, this new EC&M type ZHA Air-Break Motor Starter utilizes magnetic contactors having(certified)50,000 kva interrupting capacity. For circuits of higher fault capabilities, Volt-Ampere-Limitor (VALIMITOR) Starters, with air-core reactors, limit infinite available kva to a low finite value for interruption by the ZHA Contactor.

These new 50,000 kva and Volt-Ampere-Limitor (VALIMITOR) Starters are available in a wide range of sizes for squirrel-cage and synchronous motors as well as for wound-rotor motors. Starters can be furnished in standard, gasketed and weather-resistant enclosures.

Write today for Catalog No. 1060

THE ELECTRIC CONTROLLER & MANUFACTURING COMPANY

2698 EAST 79th STREET • CLEVELAND 4, OHIO

STEEL
September 27, 1954

Technical Outlook

IMPROVED LUBRICANT— Load-carrying capacity of copper-lead and aluminum sleeve bearings has been increased about 100 per cent by a fine rouge additive in lubricating oil. The 1-micron abrasive improved surface finish of bearings under low load conditions before high loads were applied.

MACHINING WITH SOUND WAVES— Look for ultrasonic machining on jet engine, guided missile and other military parts. Tiny abrasive particles are hammered against the work material to make accurate, complex recesses and cavities in tungsten tool steel, carbides and other materials. W. Lunsford Long, Tungsten Institute president, reported on the process at the institute's annual meeting in San Francisco.

VACUUM HOLDS— U.S. Air Force Cambridge Research Center has developed a vacuum face plate for holding thin sheet stock to a lathe for machining. Said to be ideal for machining metal and polystyrene discs as thin as 0.005 in., the device eliminates clamping and jig making. Accuracy is 0.001 in. on machined surfaces.

FAST ANALYSIS— In analysis of alloy steels at Wright Air Development Center, a 10-gram sample is dissolved in nitric acid. Conventional spectrophotometric analysis then determines amount of chromium, copper, manganese, molybdenum, nickel, phosphorus, silicon and vanadium. Similar procedure is used for aluminum alloys. Chemists there have developed a working laboratory manual for the analysis.

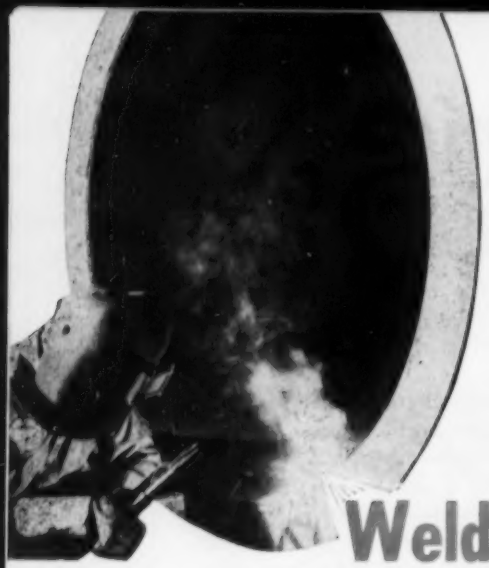
BRAZING MOLY— The best way to get high strength joints in brazed molybdenum is to use induction heat in an Argon atmosphere. In general, however, room temperature strengths of brazed specimens were low because of recrystallization of base material and because of notch effects inherent in specimen design. Studied were 16 high-temperature brazing alloys with melting points 1800°F or above. Haynes alloy 25 was the best cobalt-base brazing alloy, having short-time wear strength of 14,250 psi at 1800°F. Inconel, which produced a joint with short-time shear strength of 18,800 psi at 1800°F, was the best noncobalt-base alloy. Battelle is doing the work for Wright-Patterson AFB's materials laboratory.

NEW STRUCTURAL— The Navy says it's developing a new structural material that is a product of new methods for bonding fiberglass. Result will be high-strength laminates and tubular products suitable for higher temperatures than present fiberglass materials. It's resistant to the usual corrosive agents, and raw materials necessary for production are readily available. The Navy is looking for industrial help to push the work.

ALUMINUM FOR HOT BOXES— GM's research laboratory has attacked the problem of railroad journal bearing failures from two angles: Lubrication and design. They've shown how an oil additive compatible with the bearing metals prevented scoring. They also substituted an aluminum bearing for the standard bronze model. New type weighs about 8 lb., and where a bronze type produces copper penetration in the steel axle or journal, the aluminum bearing does not.

SOLUTION CERAMICS— Armour Research Foundation says it has developed radically new ceramic coatings that can be applied to almost any clean metal at a few hundred degrees fahrenheit. Coatings applied from chemical solutions are refractory metal oxides—zirconia, chromia, titania, ceria, and magnesia. Uses in the foundry include coatings for molds, chills, cores, etc. High temperature coatings include wire and thermocouples.

Metalworking Outlook—p. 33 Market Outlook—p. 121



PART I

HYDROGEN

Welding's Big Troublemaker

At the roots of most weld defects you'll find hydrogen playing the villain's role. An expert discusses why and gives some practical ideas for minimizing the difficulties

By HELMUT THIELSCH
Metallurgical Engineer
Grinnell Co. Inc.
Providence, R. I.

HYDROGEN is one of the major causes of cold weld metal cracks and base metal cracks. Moreover, excessive hydrogen may be responsible for weld metal porosity.

Other factors may, to varying degrees, contribute to these defects, and sometimes they may even be completely unrelated to hydrogen. Nevertheless, hydrogen is one of the primary factors causing these defects.

Major Defects — Ordinarily, a weld deposit is expected to be sound structurally and perform reliably within limitations of the weldment design and the metallurgical characteristics of the material. However, when improper welding procedures or materials have been used, one or several types of unsoundness may result:

1. Porosity and inclusions in the weld metal, 2. cracks in the weld metal, and 3. cracks in the base metal. Although these defects occur during or soon after the completion of the welding operation, they may not be detected until failure has occurred in service.

Such failures are often extremely hazardous, as in high-temperature high pressure steam or refinery piping, and careful inspection and control of the fabrication procedures has been established by major pipe fabricators to insure that the weldments are free of dangerous defects.

Two Ranges — Tendency for cracks to develop in the weld metal or base metal, seems to be greatest when the cooling weld area passes through two temperature ranges. One range is at high temperatures, from the temperatures at which the weld metal solidifies down to about 1800 to 1600°F, depending upon factors such as the composition of the steel. In this range cracking is referred to as hot cracking, hot tearing or hot shortness.

The other temperature range is from about 400°F down to room and sub-freezing temperatures. It is usually referred to as cold cracking. Since hot cracking is generally not affected by the presence of hydrogen, it will not be discussed here.

Sources of Hydrogen—Hydrogen is generally supplied to the weld metal from: 1. Certain atmospheres which may surround the welding medium, 2. the presence of humidity in the atmosphere or of water in the area to be welded, 3. an electrode coating containing moisture, cellulose or other hydrogen-forming constituents, or 4. the base metal itself.

Intense welding heat produced by the arc dissociates the water vapor and other hydrogen-bearing constituents into atomic hydrogen. In this state the hydrogen diffuses readily into the molten weld metal from the arc atmosphere. Molten steel can absorb 0.0024 to 0.0030 per cent and more hydrogen.

Since the solubility of hydrogen in steel increases with temperature, much larger quantities of atomic hydrogen can be dissolved in molten iron or steel than could be if these materials were in their solid state. The solubility of hydrogen in austenite at 2600°F is about 0.001 per cent and in ferrite at 1600°F is about 0.00025 per cent. At 1000°F, it is only about 0.00008 per cent and at room temperature about 0.00002 per cent.

Diffuses Out—As the temperature of the molten steel decreases, some hydrogen, in highly hydrogenized materials, will diffuse out of the weld metal deposit into the atmosphere and also into the adjacent heat-affected zone of the base metal.

Normally the fall in the temperature is so rapid that diffusion cannot take place with sufficient

WELDING ELECTRODE CHECKCHART

Popular designation	ASTM Specification No.	Grade	Recommended electrode	Preheat and interpass temperature*	Stress-relieving heat treatment (1 hr. per in. of wall thickness—½ hr. min.)
Carbon	A53-52T	A, B	E6010, E6015, E6016	300-400	1150-1250
	A83-52T	A, B			
	A106-52T	A, B			
	A134-51T				
	A135-51T	A, B			
	A139-51T	A, B			
	A155-52aT	C45, 50, 55			
	A161-52T				
	A178-51T	A, B, C			
	A179-51T				
	A192-51T				
	A210-52T				
	A214-51T				
	A226-51T				
C-½ Mo	A155-52aT	CM65, 70, 75	E7010, E7015, E7016	300-400	1200-1300
	A161-52T	T1			
	A209-51T	T1, T1a, T1b			
	A250-51T	T1, T1a, T1b			
	A335-52aT	P1			
½ Cr-½ Mo	A155-52aT	½ CR	½ Cr-½ Mo (E8016)	300-400	1250-1325
	A335-52aT	P2			
1 Cr-½ Mo	A155-52aT	1 CR	1¼ Cr-½ Mo (E8016)	300-400	1300-1350
	A213-52T	T12			
	A335-52aT	P12			
1¼ Cr-½ Mo-¾ Si	A155-52aT	1¼ CR	1¼ Cr-½ Mo (E8016)	300-400	1300-1350
	A199-52T	T11			
	A200-52T	T11			
	A213-52T	T11			
	A335-52aT	P11			
1¾ Cr-¾ Mo	A199-52T	T3	2 Cr-½ Mo, 2¼ Cr-1 Mo (E9016)	400-500	1300-1375
	A200-52T	T3			
	A213-52T	T3			
	A335-52aT	P3			
2 Cr-½ Mo	A199-52T	T3b	2 Cr-½ Mo, 2¼ Cr-1 Mo (E9016)	400-600	1300-1375
	A200-52T	T3b			
	A213-52T	T3b			
	A335-52aT	P3b			
2¼ Cr-1 Mo	A155-52aT	2 CR	2¼ Cr-1 Mo (9016)	400-600	1325-1400
	A199-52T	T22			
	A200-52T	T22			
	A213-52T	T22			
	A335-52aT	P22			
2½ Cr-½ Mo-¾ Si	A199-52aT	T4	2¼ Cr-1 Mo (E9016)	400-600	1325-1400
	A200-52T	T4			
3 Cr-1 Mo	A199-52T	T21	5 Cr-½ Mo (E502)	600-700	1350-1400
	A200-52T	T21			
	A213-52T	T21			
	A335-52aT	P21			
5 Cr-½ Mo	A155-52aT	5 CR	5 Cr-½ Mo (E502)	600-800	1350-1400
	A199-52T	T5			
	A200-52T	T5			
	A213-52T	T5			
	A335-52aT	P5			
7 Cr-½ Mo	A199-52T	T7	7 Cr-½ Mo, 9 Cr-1 Mo	600-900	1350-1400
	A200-52T	T7			
	A213-52T	T7			
	A335-52aT	P7			
9 Cr-1 Mo	A199-52T	T9	9 Cr-1 Mo, 12 Cr (E410)	600-900	1350-1400
	A200-52T	T9			
	A213-52T	T9			
	A335-52aT	P9			

*Use lowest temperature for sections up to ½ in. thick and highest value for sections over 2 in. thick, with intermediate temperatures for intermediate thicknesses.

rapidity to allow the hydrogen content to remain within the solubility limit of hydrogen in steel. Thus supersaturation of hydrogen occurs and results in the rejection of hydrogen at void spaces or other structural inhomogeneities present within the steel.

At room temperature the hydrogen content of weld deposits from standard electrodes varies between 0.0001 and 0.0020 per cent. Obviously, there is always a supersaturation of hydrogen.

Porosity—There is still disagreement among the authorities as to whether hydrogen, by itself, can or cannot form porosity. In any case, hydrogen will enter into gas reactions which occur during welding in the welding arc and in the weld metal. Entrapment of the resulting gases in the solidifying weld metal is one of the major factors causing porosity.

Gas bubbles may also form by chemical reactions occurring in the molten weld metal pool during welding. Being lighter than the molten weld metal they tend to rise to the surface of the weld deposits. If the bubbles fail to reach the surface of the weld metal pool before it solidifies, they will be entrapped as internal porosity. If they reach the surface, they may appear as external or surface porosity.

Porosity Reactions—Most effective weld-metal gas reaction occurs in the welding of the sulphur and selenium-bearing free machining steel grades. The sulphur or selenium in the steel reacts with the absorbed hydrogen and forms hydrogen sulphide or hydrogen selenide gas bubbles, which are generally entrapped in the weld metal. To prevent porosity in sulphur and selenium-bearing steels (containing over 0.05 per cent S or Se) dry, low-hydrogen electrodes should be used.

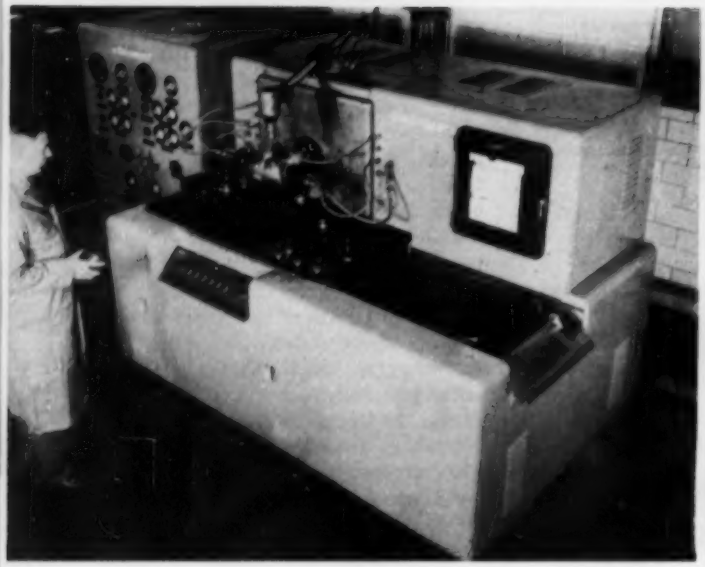
Welding of aluminum-killed steels with electrodes having cellulose-type coatings such as the AWS types EXX10 and EXX11 may also result in weld metal porosity, particularly when slow welding speeds and low currents are used. With steels where this is critical, dry, low-hydrogen electrodes should be used. Silicon between 0.10 and 0.50 per cent also is believed to promote the formation of porosity.

Water Vapor—Another reaction in the weld metal which may result in porosity is the so-called water vapor reaction where hydrogen reacts with iron-oxide present in the weld metal to form iron and water vapor. This reaction will continue until either the available oxygen or hydrogen supply in the weld metal has been used.

Other sources of porosity may be the result of the formation of carbon-monoxide produced by the reaction of iron-oxide with carbon and methane produced by the reaction of carbon with hydrogen. The first reaction, of course, does not depend upon the presence of hydrogen.

Ordinarily, welds made with present-day arc-welding electrodes are unlikely to experience these reactions in significant quantities, unless either improper welding procedures are employed, or the base steel contains a large amount of oxide inclusions.

(To be concluded next week)



Teeth on spur gears are hardened to 54 to 56 Rc at rate of 100 per hour. The gear material is SAE 8640

Cam lubes and bearing surfaces for auto camshafts are hardened to 55 to 58 Rc at the rate of 110 per hour

No. 9 in STEEL's
MODERN HEAT TREATING SERIES

Selective Hardening

Precision flame hardening makes it possible to control core property and case relationship, depth and location of the case, as well as specified tensile strengths of the core

CONCENTRATE HEAT, control temperature, confine hardness—all were guideposts in the development of localized hardening methods. The goal: To condition the surface of steel to the hardness wanted and to put it exactly where needed.

The driving force back of selective hardening is modern design, calling for better physical properties in steel components. That's because of today's better weight-horsepower ratio, the trend to reduce material costs and need for longer life. Not to be overlooked are physical space limits imposed on parts.

Precision flame heating for selective hardening is at the forefront of the battle to get more strength and fatigue life from a given cross section. Here are some things production men are finding they can do when they put the hardness exactly where it's needed.

Cheaper Steel — Plain carbon steels can be used in some applications where alloy steels were used. The carbon types can be quenched out and tempered to the desired core strength. Then the bearing surfaces can be hardened to the figure needed for wear and load carrying properties. Case depth can be varied to fit service.

Sometimes you actually end up with a better part by going to a lower hardenability steel. Example: Automobile crankshafts, where hardness is needed on bearing surfaces for wear resistance and in the fillets for fatigue resistance.

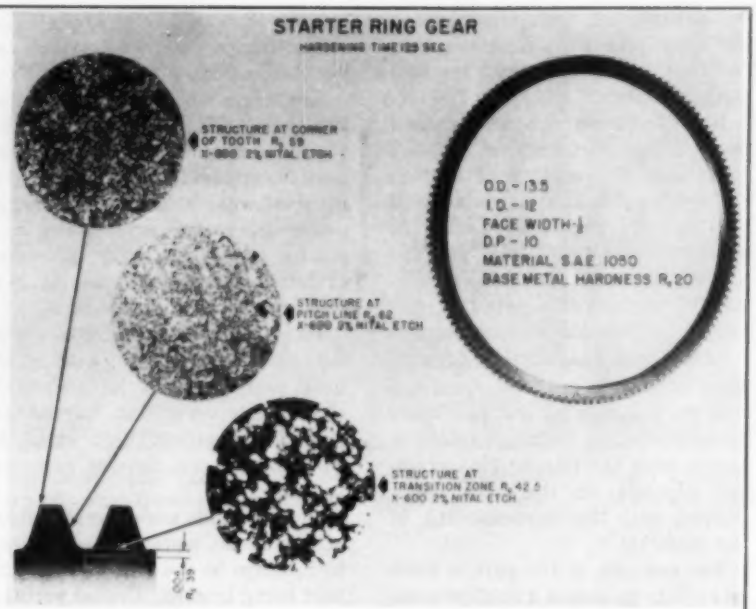
Or take gears. Here the equivalent of a carburizing job is done using medium carbon steel. Result is high hardness on tooth profiles (needed for wear resistance to obviate surface fatigue), while keeping high core strength for impact and fatigue resistance.

Another case: A worm shaft 27½ in. long. Hardness is required only on the surface of the worm threads. The manufacturer switched to plain carbon steel instead of more expensive alloy steel being used for carburizing.

Alloys Too—Alloy steels are also used with selective methods where good core properties and deep hardened cases are needed. The part is hardened and tempered to the desired core property, then the bearing surface is hardened.

A key point is that localized hardening makes it possible to heat treat and temper for core properties and subsequently harden only the bearing surfaces. This sequence also makes it possible to produce the desired stress patterns.

This means that strength may be added where desired by hardening the highly stressed section of the part. Many times only a fillet


STARTER RING GEAR
HARDENING TIME 125 SEC.
STRUCTURE AT CORNER OF TOOTH R_c 59
X-600 2% NITAL ETCH
STRUCTURE AT PITCH LINE R_c 62
X-600 2% NITAL ETCH
STRUCTURE AT TRANSITION ZONE R_c 42.5
X-600 2% NITAL ETCH
O.D. - 13.5
I.D. - 12
FACE WIDTH - 1
D.P. - 10
MATERIAL S.A.E. 1050
BASE METAL HARDNESS R_c 20

by Flame Heating

By V. B. BULLEN, *Supt.*
Process Machinery Division Laboratories
Cincinnati Milling Machine Co.
Cincinnati
and
D. M. STRAUCHEN
Consulting Engineer

is hardened so it will resist fatigue failure. The increased volume resulting from surface hardening gives compressive stresses on and near the surface. These stresses help to develop a prolonged fatigue life.

High Accuracy — Need for extreme accuracy is often necessary in addition to other requirements.

A torque converter over-riding clutch cam is a good example of this. On this part, the heat patterns on the multiple internal cam faces must be held within close limits for depth and length. At the same time the piece itself must retain its original geometry within 0.002 in.

Due to the highly localized areas heated, distortion in parts is kept to a minimum. This cuts down on straightening and grinding costs.

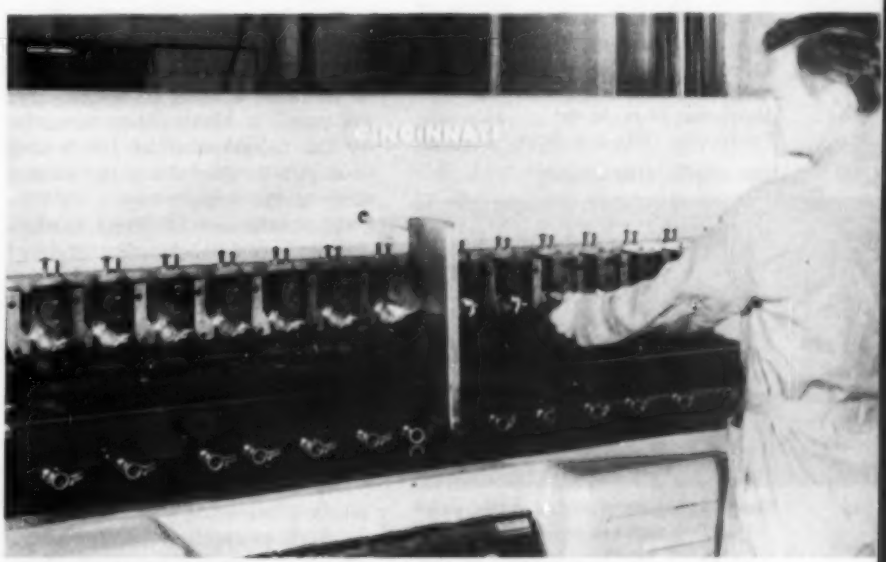
Controlled—With flame hardening the core properties can be controlled to obtain proper strengths. Tensiles of 100,000 psi are reached with yield strengths of 40,000 to 80,000 psi.

Many end uses require high core strength. The parts are quenched out to give maximum hardness, then tempered to the desired core property. Bearing areas may in turn be hardened to the required value. This gives the desired combination of core transition zone and hard bearing surface.

If a carburizing grade of steel is used (not more than 0.2 per cent carbon), the carbon is too low for high core properties. Advantage of the higher hardenability steel is that the core properties can be controlled and kept in line with the geometry and stress pattern of the part.

Good Enough — Plain carbon steels develop good core properties if the cross section is not too large. A good rule to follow is to choose the carbon content so the part will quench out to the desired hardness from the center out to the surface of the part.

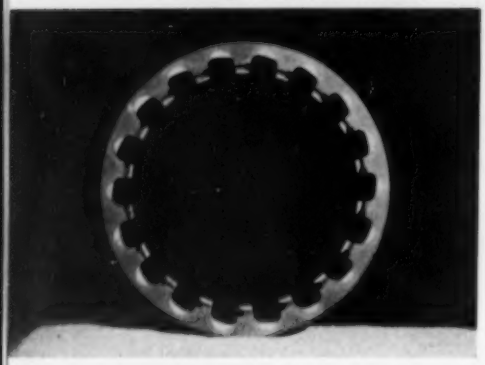
The carbon content can be determined by relating the critical section of the part to the hardenability of the steel as given by the end quench specimen or hardenability (H) band. Remember: A steel must be chosen for the proper



Hardening rocker arms on a dual station Flamatic operating right in the production line. Hardness is put exactly where it is needed, and the core is not disturbed. No corrective machining is needed. Except for loading operation, machine is automatic

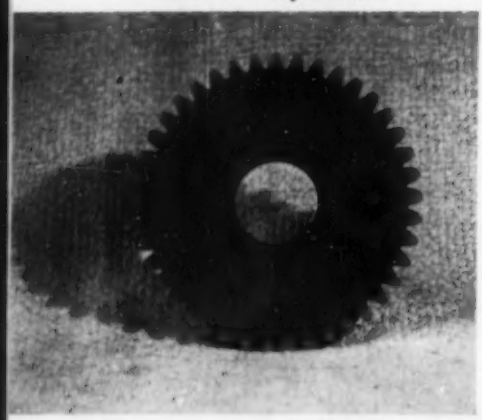
FLAME HARDENING AT WORK

Hardening Inaccessible Areas



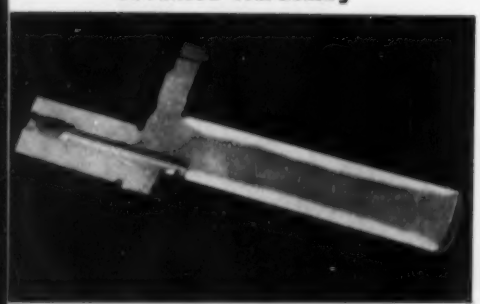
Part: Over-ride clutch cam for automatic transmission
Operation: Harden 18 internal cam bearings
Hardness: 58 to 60 Rc
Production: 60 per hour

Localized Hardening with Core Properties



Part: Spur gear; SAE 8640
Operation: Harden steel to working depth
Hardness: 54 to 56 Rc
Production: 100 per hour

Localized Hardening



Part: Refrigerator crankshaft; pearlitic malleable
Operation: Harden bearing surface from end into fillet at counter balance
Hardness: 45 to 55 Rc
Production: 170 per hour

combination of case depth, core hardness and heat treatment to develop a satisfactory residual stress pattern.

High hardness can be obtained on bearing surfaces with flame hardening. The amount of heat in the localized heated area is small and can be removed rapidly to give a high rate of quench. The underlying metal helps in quenching the surface of a part that has an appreciable sized cross section.

In Between Zone—The transition zone (the zone gradient from the case to the core of the part) can be controlled by heating rapidly or slowly with the flame. This gradient depends on the case depth desired and the hardenability of the material.

For example, if the part is heated rapidly to obtain a shallow case, the gradient of the transition zone is steep. But if the part is heated slowly and hardenability of the steel is not too high, the gradient will be slow or gradual.

Metallurgists say it is important to have little softening between the case and the core in this transition zone. Here's one of the values of precision flame hardening process: By picking steel of right hardenability and heating at the proper rate, the transition zone can be controlled. Then you can get proper stress patterns in the part.

Principles—There are three basic problems in selective hardening with a flame hardening machine: 1. Limiting heating to defined area of part; 2. Controlling accurately the temperature of the heated surface; 3. Quenching the heated area in the correct way.

Mechanization of flame hardening has seen development of what might be called "heat treating machines" with the flexibility, compactness and precision of the modern lathe or milling machine. Typical are units for the Cincinnati Flamatic process. They are installed at the proper spot in the production line.

Auto — The flame hardening method has made a niche for itself in high production plants in the automotive field. Important here, among other factors, is that the equipment can be placed directly in the production line, making for orderly flow of parts through the manufacturing steps, as well as reduced handling expense.

Engineers who laid out facilities for the Buick V-8 engine picked the flame method keyed to mechanized machines for localized treatment of wear areas on camshafts, pushrods, rocker arm shafts and starter ring gears. Five variations of the basic flame hardening machine are used to do the job.

Heat Source—Fuel gas is a mixture of oxygen and propane. Hardness patterns may be controlled closely by correlating burner design and location, heat input to gas mixture and time of exposure to flame.

Burner heads are generally made of low brass, water-cooled, shaped to conform to the curvature of the part being treated. Drilled ports or inserted tips direct flames on the localized areas to be hardened.

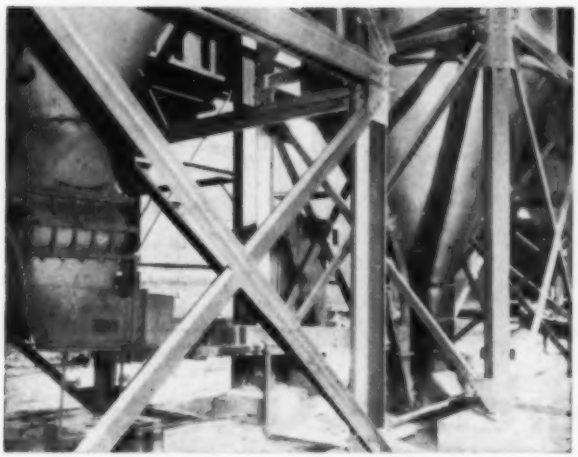
Control of the hardening cycle is automatic once a set-up has been made. Loading the parts into the heating position is the job of the operator, except where a magazine or hopper feed system can be used.

At Buick, after the heating cycle, pieces are dropped off the fixtures or lowered mechanically into quench tanks at the base of the machines. A conveyor removes quenched parts from the oil.

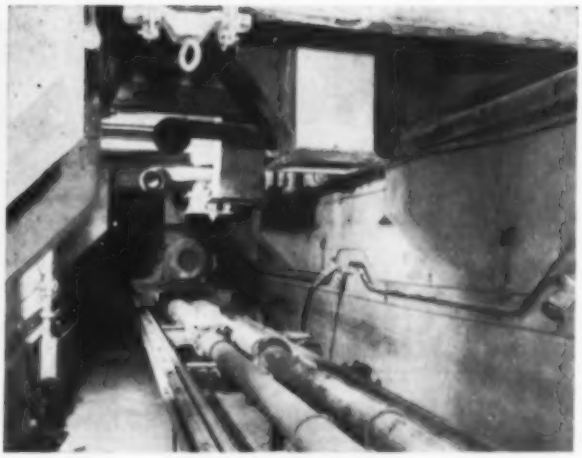
What's Ahead—As for the future of flame heat treating, we see parts being turned out with the elimination of present-day variables. Processing will begin on the designer's board with closer controlled, almost perfect material.

He will specify such things as core hardness and hardness gradient, surface hardness and surface hardness gradient, stress pattern (including depth of compressive condition and where the reversal should begin), finished size, surface finish and perhaps even the final weight of the part. This will require new testing methods to check the sensitive balances that must be held in future component parts.

No. 10 in STEEL's Modern Heat Treating series will appear October 18. It will cover induction heating for selective hardening and other heat treating applications.



Ingredients are spotted in shed and discharged through track-grating to pneumatic conveying system



Pump beneath track grating delivers incoming material to storage. Second pump is to supply bins above mixers

A Way to Handle Sand Ingredients

Corn flour, silica flour and bentonite, formerly handled in bags, are now received in bulk and delivered to storage, then to process, by a conveying system

A PNEUMATIC CONVEYING service delivers bulk supplies of corn flour, silica flour and bentonite from freight cars to storage, then from storage to process at General Steel Castings Corp.

Once Bagged—Formerly, these materials (they're mixed with core and mold sand) were received in bags and were manually unloaded, stored and transported to mixers. The Fuller-Kinyon system eliminates manual operations and speeds car unloading and delivery to mixers.

Dusty working conditions are done away with, bag-storage space is released for other uses and the rodent nuisance is practically eliminated. Of course, bulk comes cheaper than bag lots. Waste due to breakage of bags and windage is eliminated.

Pumps Trucked—Two of Fuller Co.'s portable pumps are in an underground tunnel. They are mounted on trucks that run on a narrow-gage track for ease in positioning beneath the hopper-bottom cars or storage bins. One pump is used mainly for delivering to storage, the other for reclaiming from storage and delivery to supply bins above mixers. It's possible to reclaim and unload at the same time.

The pump has a screw element that advances the material into a mixing chamber, in which it is made fluent by compressed air. From this chamber, air at 15 psi discharges the material to an air line for delivery to storage bins—eight bins holding about 30 tons of material each.

Indirect Discharge—Bins are located so that they cannot discharge directly into a pump. F-H Airslide conveyors bridge the gap. Material from bins discharges through a Fuller rotary valve to an F-H Airfeeder, to an Airslide and to the pump.

The Airfeeder is directly beneath the rotary valve. Compressed air is introduced at 3 psi into the Airfeeder and circulates upwardly into the bin, aerating the material and helping prevent arching and hang-up.

The Airslide is rectangular in cross section and divided horizontally by a porous fabric. Air, at 15-in. water-gage pressure, is introduced into the lower section and passes through the fabric, fluidizing the material above, causing it to flow by gravity to the pump. A weir separates the Airfeeder and Airslide pressure areas.

Part 4

Correlating Blast Furnace Operating Concepts

Reducibility of ores depends upon conditions under which heat is applied and the thermal needs of other reactions. Amount of heat is secondary

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

WHEN blast furnace practice was governed entirely by trial and error methods, it was learned that pig iron could be produced more easily from some ores than others. Research later disclosed that the iron contained in ore existed in the form of mineral compounds, each compound having certain distinguishing characteristics of chemical composition and crystalline formation. Each compound was given a name for identification.

Natural ores in which the respective iron compounds predominated were classified under the compound name. Because of limited technical science, the cause of difference in reducibility was attributed to the differences in iron compound characteristics—a proposition data from American furnace operations would tend to support.

Opinion Is Mixed—As knowledge of the technical science of blast furnace operation advanced, some writers recognized the effects of ore physical properties (hardness, density, particle size) upon their reducibility, but the opinion of the majority of operating personnel continued to be based upon the iron compound identification. There was a tendency to accept the generally believed half-truths of furnace practice lore rather than an occasional disclosure of contrary opinion.

The proof afforded from such study indicates that here again there is an example of a commonly accepted erroneous conception regarding a cause.

Iron compounds in blast furnace burden material generally are classified as oxides, hydroxides, sulphides, carbonates, and silicates. The oxides and hydroxides predominate in ores used in their natural state. Where the sulphides and carbonates exist in appreciable percentages, materials containing them require beneficiation to make their use economically practical. With any beneficiation process where a fusing temperature is attained, the formation of silicate compounds in the finished product is inevitable.

Compositions Are Numerous—In the pure form each of the compound classifications cited has two or more compositions. In impure forms, as they usually occur in furnace burden materials, each classification may have several compositions. In the pure form the iron content of compounds that are usable in their natural state will range between the carbonate ($FeCO_3$ = 48.2% Fe) and the magnetite (Fe_3O_4 = 72.4% Fe). The hematite (Fe_2O_3 = 70.0% Fe) compound is most widely disseminated in ores throughout the world. In an impure state, in natural or beneficiated materials, the iron content of existing compounds may cover a wider range.

Reduction of Fe to the metallic involves dissociation of the Fe from one or more of the chemical constituents with which it is compounded. It is a principle of thermochemistry that every chemical reaction consumes or evolves a fixed amount of heat for association of its constituent parts and reverses the flow of heat in like amounts when the constituents are dissociated.

Reduction of one pound of Fe from the hematite oxide requires 240 more Btu (8.25%) than reduction of an equal weight of Fe from the magnetite oxide. Based on this fact of technical science, hematite ore should always be more difficult to reduce than magnetite ore. But for many years numerous actual furnace operations using Lake hematite ores

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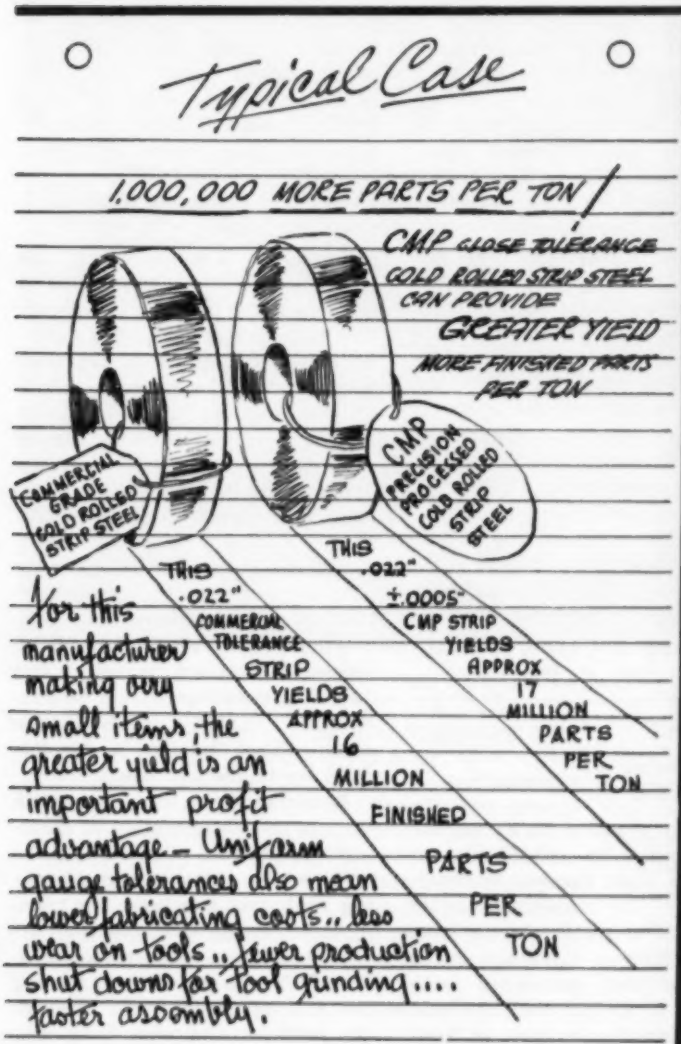
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produced pig iron with greater thermal economy than those using Eastern District magnetite ores.

Heat Requirements—The amount of heat required for reduction of Fe from the hydroxide compounds is always the amount required for the oxide reduction (usually Fe_2O_3), plus the amount required for dissociating the H_2O (variable in amount), which is compounded with the oxide. On the basis of this fact of technical science, the hydroxide ores should be more difficult to reduce than the hematite and magnetite ores. Yet furnace operations using the respective ores do not sustain the technical science fact.

The amount of heat required for reduction of Fe from the numerous iron silicate compounds is always the amount required for the oxide reduction (may be FeO, Fe_2O_3, Fe_3O_4), plus the amount required for dissociating the SiO_2, compounded with the oxide.

Dissociation Facts—It is a fact of technical science that dissociation of H_2O from the hydroxide compounds can be effected at a temperature lower than the initial fusion temperature of the compound solids. It is a like fact that dissociation of SiO_2 from the silicate compounds can be effected only at a temperature that is above the initial fusion temperature of the compound solids. In the light of these facts reduction of Fe from materials containing iron silicate compounds should be more difficult than from ores containing any of the other compounds which have been cited.

But within recent years at operations where iron-bearing materials have consistently contained substantial percentages of iron silicates, pig iron has been produced at comparable rates of time for reduction (and with greater thermal economy) than at operations where iron-bearing materials were virtually free from such compounds.

When these seemingly conflicting facts of practical and technical sciences of furnace operation are analyzed it becomes apparent: Although tests of technical science clearly indicate differences in thermal requirements for reduction of Fe from the respective compound, they do not indicate the conditions under which the reduction occurs in a blast furnace; nor do they consider the requirements of other thermochemical reactions, or the mechanical reactions of stock and gas flow, which are associated with Fe reduction in blast furnace operation.

TABLE V—COMPARISON OF BURDEN RATIOS

	South	Matheslus North	East
Moisture and combined volatile matter, %	14.00	12.00	1.50
Burden weight delivered to smelting operation, max %*	86.00	88.00	98.20
	100.00	100.00	100.00
Fe content of ore, %	43.28	51.19	54.55
Fe content of ore and scrap, %	48.31	51.22	57.35
Burden ratios:			
Ore to coke	1.60/1.00	2.41/1.00	2.55/1.00
Ore and scrap to coke	1.73/1.00	2.44/1.00	2.78/1.00
Ore, scrap and stone	2.20/1.00	2.91/1.00	3.00/1.00

*Disregarding flue dust produced.

Reaction Is Exothermic — Although technical science research proves dissociation of Fe from oxygen is an endothermic reaction, calculation based upon technical science principles proves the reaction, in its complete cycle, is exothermic since the oxygen dissociated from the Fe unites with carbon to generate more heat than initially consumed for its dissociation. The exothermic nature of the reaction in its complete cycle is indicated in the following heat balance calculation procedure[9]:

0.93 x 2000 lb Fe = 1860 lb Fe reduced

Fe_2O_3	+	3CO	=	2Fe	+	$3CO_2$
−344,800 Btu		−157,464 Btu				+3(174,960) Btu
−157,464 Btu						−524,880 Btu
−502,264 Btu						−502 264 Btu
						−22,616 Btu

$$\frac{+22{,}616 \text{ Btu}}{111.68 \text{ lb Fe}} = +202 \text{ Btu/lb Fe}$$

Furnace practice data indicate the difference in reducibility of ores in a blast furnace is determined by the conditions under which heat is applied to the ores, and the thermal requirements of other reactions associated with reduction of Fe in a blast furnace, rather than the amount of heat required for reduction of iron compounds alone. The two extremes under which Fe is reduced in a blast furnace follow.

Technical Science Teaches—Fe can be reduced from the oxide formation with carbon monoxide (CO) or hydrogen (H_2) contained in furnace gas, at a temperature as low as 190°C. Also, iron oxide compounded in a silicate must first be dissociated from the silica before reduction of the oxide can be effected, and the dissociation requires a temperature in excess of the initial fusion temperature of the compound solids. United States Bureau of Mines research[8] recorded initial fusion at 905°C; a temperature of 1000°C may be assumed as a representative maximum requirement.

Reduction Easy — Using the truths of practical and technical sciences for a premise, it follows: The reduction of Fe to the metallic state (regardless of its compound form of existence) is one of the reactions most easily effected in a blast furnace. But as technical papers show, contrary opinions are widely held, particularly with regard to the iron silicate compounds. Here again is a condition of confused thought that calls for a review of available particulars with discrimination.

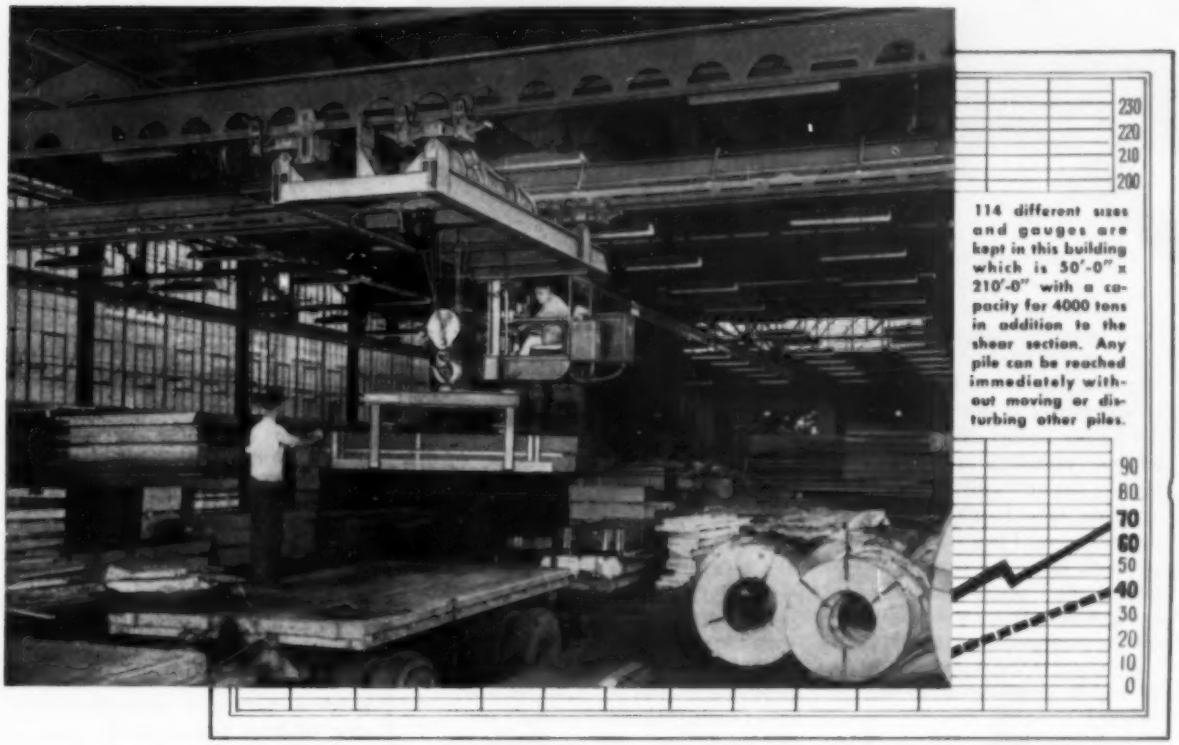
When such a review is made the distinction between "rapidity" and "ease" of reduction should be considered. Rapidity involves time alone. Ease implies a possible differnce in thermal needs.

Reduction Rate Increases—With the gradual deterioration in chemical composition of natural Lake ores and the better grades of coking coal, this has been the trend in Lake ore furnace practice: Attempts are made to increase rapidity of Fe reduction by increasing the rate of stock travel through the furnace. The plan is to compensate for forced reduction in ore/coke burden ratio, which is caused by the deterioration in burden material quality. There has been a sacrifice of thermal economy for conversion.

Beneficiation of low-grade burden materials provides desirable chemical composition. It also imparts physical properties to the beneficiated products, permitting ease of Fe reduction without sacrifice of rapidity of reduction. So a change in furnace practice

Crane Cuts Steel Handling Costs 66⅔%

Boosts Shear Production 40%



Up to 15 truck loads, or 150 tons of incoming steel are handled in a day by a 5 ton, 48'-0" span, 3-runway Cleveland Tramrail crane in the warehouse of the Art Metal Construction Co., Jamestown, N. Y., well-known manufacturers of office furniture. This formerly was lifted off the trucks with a chain hoist onto floor trucks which handled it thereon.

The new Tramrail Crane takes the steel directly from trucks to storage without re-handling, and, also, from storage to shears. One man in the crane cab and another on the floor take care of the entire steel handling job. The man-hours required for this have been cut to one-third.

An extra advantage, not originally anticipated, has been the increased output of the six shears. Formerly, it was necessary for the shear operators to haul the steel they cut, from storage to their machines. Now this is done by the crane. As a result, the shears are in operation more of the time and shear production has been increased 40%.

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methods suitable to the beneficiated product properties is in order. Study clearly indicates the need for such a change is in accord with the teachings of the practical and technical sciences.

Physical Properties Effect—The effect which physical properties of iron-bearing materials have on the rapidity of Fe reduction may be illustrated with a comparison of data from furnace operation:

1. Natural soft hematite ore from the Lake region, with its large percentage of fine particle size material, will reduce more rapidly than the natural hard lump magnetite ores from the Eastern District.
2. Hard lump hematite ore (example—Northwest England and Swedish hematite ores) will require as much time for reduction as hard lump magnetite ore.
3. Hard lump magnetite ore, when ground to a fine particle size comparable to the soft Lake hematite fines, will reduce as rapidly as lake hematite ore.

In a normal Lake ore operation a burden change will "come through" the furnace in about 10 hours. This indicates the rate at which Lake ore can be processed because of the opportunity afforded by the fine particle ore for gas-solid contact and rapid transmission of heat from gas to stock.

Lump Hematite — Clements,[8] when commenting on the use of hard lump hematite ore from Northwest England, says;

"The maximum size of the ore as charged is 6 in., but the bulk is composed of rubble and fines. Working with a blast temperature of 1100°F, the coke consumption per ton of iron is 2578 lb. The time required for reduction of the ore is from 18 to 20 hours, which results from the dense character of the material."

The percentage of 6-in., material, and the particle size range of rubble and fines, is not given, but consider particle sizes (as indicated) in relation to the possible gas-solid contact; consider the opportunity for rapid transmission of heat from gas to stock, which alone can rapidly prepare ore for smelting. The first quotation appears to be the logical explanation for the conditions cited in the latter two.

Unquestionably, the possible maximum rate of Fe reduction

from the total weight of ore charged (iron content 52.00 to 56.00 per cent) would be determined by the time required for preparing the 6-in. material for reduction. The ratio of surface to mass would lengthen the time requirement. The fuel rate would largely be determined by the limited opportunity afforded by the 6-in. material and the coarser particles of the rubble to effect recovery of heat.

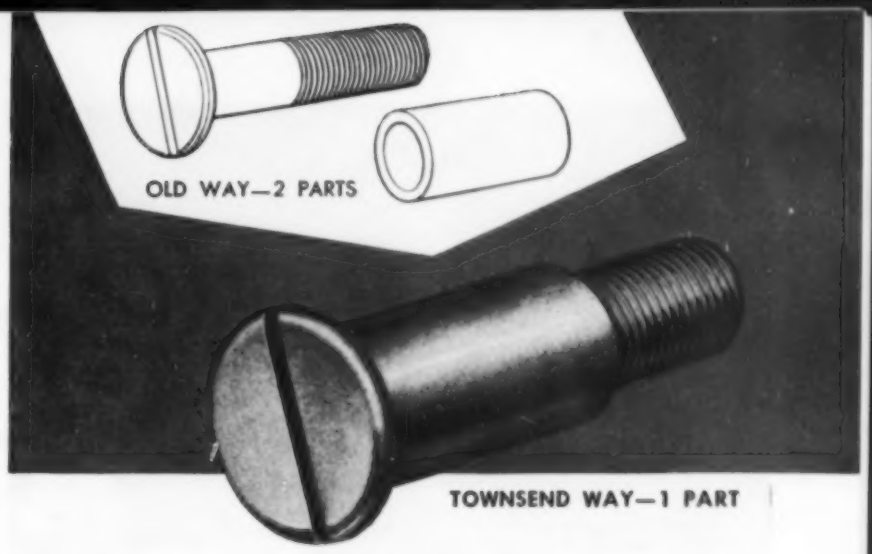
Smelting Magnetite — Pilling,[11] when describing effects observed while smelting magnetite ore (lump, unsintered and sintered fines), says;

"On account of the hard dense nature of magnetite ore, it is necessary to allow not less than 11 hours, and preferably 12 to 14 hours for reduction. When the furnace was driven faster than this, it was found that in 48 to 60 hours the unit would start to work cold, and unreduced ore would appear in the front of the tuyeres."

Clements and Pilling, the former describing effects observed when smelting hard lump hematite ore and the latter magnetite ore, both stressed density of their material as the cause of the slow rate of Fe reduction. Pilling recognized the advantage of smaller particle size of material, and favored use of sintered over unsintered fines.

More Surface — Individual particles of magnetite ore fines (sintered or unsintered) have the same degree of hardness and density as the lump particles; it is logical to believe the advantage of the fines is in the ratio of surface to mass, which affords greater opportunity for rapid absorption of heat when exposed to furnace gas. Likewise, a particle of cellular sinter will have a greater ratio of surface to mass than a lump particle of any ore of equal outer dimensions—even though the solid part of the sinter is as hard and dense as any ore can be. In short, the properties of hardness and density are not factors of practical importance to reduction of Fe in a blast furnace unless accompanied by massive material particle size.

Consider the comments of Clements and Pilling regarding effects from physical properties of



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All of these problems were quickly solved by Townsend. The Technical Sales Department designed the single cold-headed part shown above which does the work of the two pieces. Assembly is speeded, purchasing and inventory control simplified. The biggest advantage, of course, is the tight, permanent connection achieved with the Townsend part, which eliminates a headache for manufacturer and dealer alike.

This is just one typical example of how the Townsend method of producing cold-formed parts and fasteners improves products and reduces unit costs for manufacturers in the appliance industry and other industries as well.

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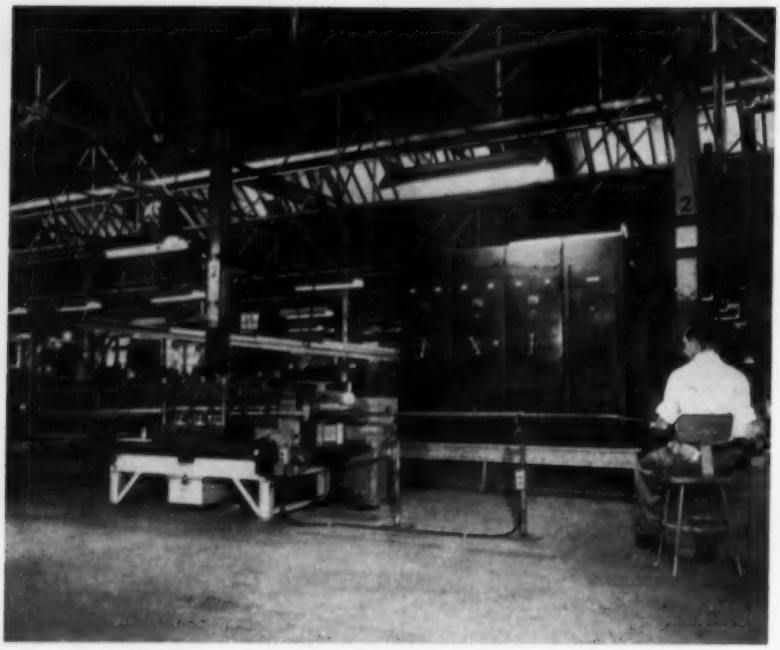

Faster Tube Straightening Without Half Trying

Here's what Hotpoint did when Calrod heating element production couldn't keep pace with electric range sales. To augment its three heavy-duty tube straighteners, the company installed a six-roll rotary unit, with rated production speed of 350 fpm. The model AXY straightens about 30,000 ft of tubing per shift; previous equipment had a 15,000-ft limit for 8 hours. Hotpoint gets adequate production with the variable speed control on the new Mackintosh-Hemphill machine set at around 150 fpm. Majority of the tubing is ¼ in. OD, with 0.018-in. wall

their respective materials in relation to the burden materials used and the practice results obtained at the East operation in Table I (STEEL, May 17, p. 106). The importance of ore physical properties and adjusted practice methods to both rapidity and ease of Fe reduction is clearly shown.

Time of Through-Put—A burden change at East (where materials were hard and dense, but accompanied with desirable particle size ratio of surface to mass) would "come through" the furnace in about 10 hours—the same as a charge made at a Lake ore operation, even though the blowing rate used was less than commonly used with a Lake ore operation.

It becomes evident that the ideal blowing rate is not determined by furnace lines, or by the weight of coke burned, but by the thermal requirements for preparing burden material for smelting and for the smelting as determined by the character of burden materials used. The true value of stock travel through the furnace is not determined by the "feet per minute" traveled by stock, but by the "pounds per minute," which are prepared for smelting. With volatile-free burden materials (similar to East materials), a greater percentage of the burden weight charged into the furnace will be delivered to the smelting zone of the operation than is possible with an equal weight of volatile bearing ore.

Burden Ratios — The effects which burden material properties have on the weight of burden delivered to the smelting operation, are apparent from a comparison of burden ratios of the three furnace operations in Table V.

Furnace operations similar to East have been limited in number because of the limited amount of similar burden material available for use, but it is not an isolated case. Comparison of East practice data with similar data from furnace operations where other classes of burden materials are used indicates what can be accomplished with fully beneficiated burden materials and properly adjusted practice methods.

Problems Were Similar — A change in the character of ore used caused Eastern district furnace operators to be confronted with operating conditions and thermal effects different from those with which they were accustomed, but their problems were similar to those that confront today's midwest furnace operators who are compelled to use Lake ores changed in character.

Pilling clearly recognized the nature of the operating effects that accompanied the change in ore properties. Necessarily, his opinions, and the opinions of all of his contemporary operators, were based upon available information. It is in no sense critical to say the opinions were based more upon the experience of practical science of furnace operation than upon technical science. At the time, (1923) many of the most illuminating teachings of blast furnace technical science had not been disclosed.

Specifically—Among these teachings were: Quantative measurements of thermal, chemical, and mechanical reactions that occur within the furnace; the relationship of zone temperatures, as recorded by United States Bureau of Mines scientists (1926 to 1929), and the all-important influence which mineral composition of slag in its progressive stages of composition has upon temperature requirements, as disclosed by McCaffery and his co-workers (1924 to 1931).

It is believed the research cited fully substantiated Johnson's 2-thermal equation theory[12] in every respect. Because of the certainty of two divisions of work in every blast furnace operation, the practice method which can be most successfully used (as exemplified in the blowing rate and blast temperature used) will always be determined by the character of burden materials used.

(To be continued)

[9] "Blast Furnace Practice," vol. 1, by Fred Clements, general manager, Park Gate Iron & Steel Co., Ltd., Rotherham, England. (Book at present out of print)

[10] Joseph and Neustaetter, *Blast Furnace and Steel Plant*, August 1947.

[11] G. P. Pilling, A.I.M.E., Philadelphia meeting, 1923.

[12] "Principles, Products and Operation of the Blast Furnace," 1918, by J. E. Johnson, Jr.

BUILT-IN EFFICIENCY

■ Every Lamson fastener is designed to serve a particular application. For maximum efficiency, most economical assembly and most satisfactory appearance, choose the fastener that's "right for the job".

The fasteners shown here each have their place in your assembly line. Choosing the right fastener for the right job is one way to take advantage of their "built-in efficiency".

PHILLIPS HEAD

There are many reasons behind the design of the Lamson Phillips head. The "X" slot really clings to the driver bit for faster assembly. They are self-aligning and straight-driving, perfect for spiral or power drivers. They draw up tighter than a slotted head, without head loss or damage and they offer the best appearance on the finished job. These advantages are yours when you specify Lamson Phillips Head tapping screws and machine screws. Available in flat, round, oval, fillister, pan and truss head shapes.

SPIN LOCK

Lamson Spin Lock fasteners are designed to "bite" and hold. The ratchet-like structure of the teech prevents "backing off" when the fastener is set. This, obviously, makes for very high holding power. Five head styles: hex, pan, truss, flat and large flat. For tapping screws and machine screws that are vibration proof, easy driving, water and oil tight around the head and that tighten flush to surface, specify Lamson Spin Lock.

SEMS

These pre-assembled washer and screw units can really save you time. No fumbling for washers, no doubling of inventory and no special assembly techniques are just a few of the advantages. Sems are available with two washer types; toothed washers and helical spring washers, and a broad variety of screws. Head styles include flat, oval, truss, pan, round, fillister and hex.

CLUTCH HEAD

The straight-walled, shallow recess design of the clutch head offers real advantages in assembling procedures. The recess centers the driver. Because the slot is not tapered, any tendency for the driver to "climb out" is held to a minimum. This means greater safety and less driver pressure to draw up the fastener. The periphery of the head is unbroken, which means that you get a stronger screw, size for size, than any other type. In an emergency, Clutch heads can be serviced in the field with a common screw driver.

Complete information on these Lamson fasteners is yours for the asking

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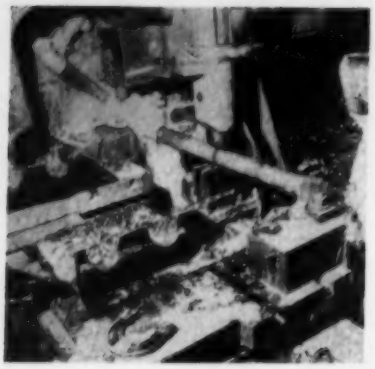
Including U bolts, eye bolts, hook bolts, etc.

MACHINE SCREWS
Clutch and Phillips recessed head screws.

SEMS
Pre-assembled lockwashers on tapping and machine screws.

Machining Truck Axles



Automatic lathe machines 48-in.-long truck axle shaft on three diameters

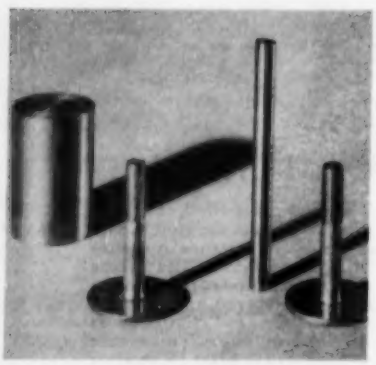
LATHES at a Detroit automotive plant are turning over a third more axles between tool grinds, using tools of grade 350 cemented carbide made by Carboloy Department, General Electric Co. Chipping and flaking, biggest problems on the job, were reduced.

The axles are an AISI 4150 steel forging, 48 in. long, 4 in. in diameter on the end that supports the brake drum and 2 in. in diameter on the spline end.

Machine Cycle—After the operator places work between two centers and lowers the rest guide in position on the axle, the cycle starts. Coolant flows as the machine is actuated. Tools move into cutting position to flange outside diameter. During the second cycle, tools work on front and back faces of the flange. Following the third cycle, involving chamfering, the axle is removed and inspected.

The tools are of the insert type, mechanically held. Three round inserts, one each for bearing diameter and front and back facing of flange, are used. Tools for other two positions are square insert-type.

Cold-Forming Small Parts



Screw part, right, by Cold-Flow saves 96.0 per cent over machining method

ADVANCED cold forming methods can produce substantial dollar savings through scrap reduction.

In comparison with conventional machining where scrap is produced as tools bring bar stock to size and shape, cold forming puts all the metal into the part. Material savings as high as 85 per cent are not uncommon.

Case History — One manufacturer, who wanted quantities of special fasteners, slashed material waste more than 90 per cent by switching to Cold-Flow, the precision technique developed by Camcar Screw & Mfg. Corp.

Produced by screw machining, 210 pounds of material were required per thousand pieces. With cold forming, only 8.3 pounds of material per thousand pieces are needed.

This method produces surface finishes as fine as 10 to 15 microinches, tensile strengths up to 180,000 psi, and upsets as high as 8 to 9 times the diameter of the wire are possible.

Tolerances on small shank dimensions can be held 50 per cent closer than machining can. Machining tolerances can be held on other small part dimensions.

Bonding Oil Sealing Rings

Etching oil sealing rings for rubberizing simplified by airless blasting

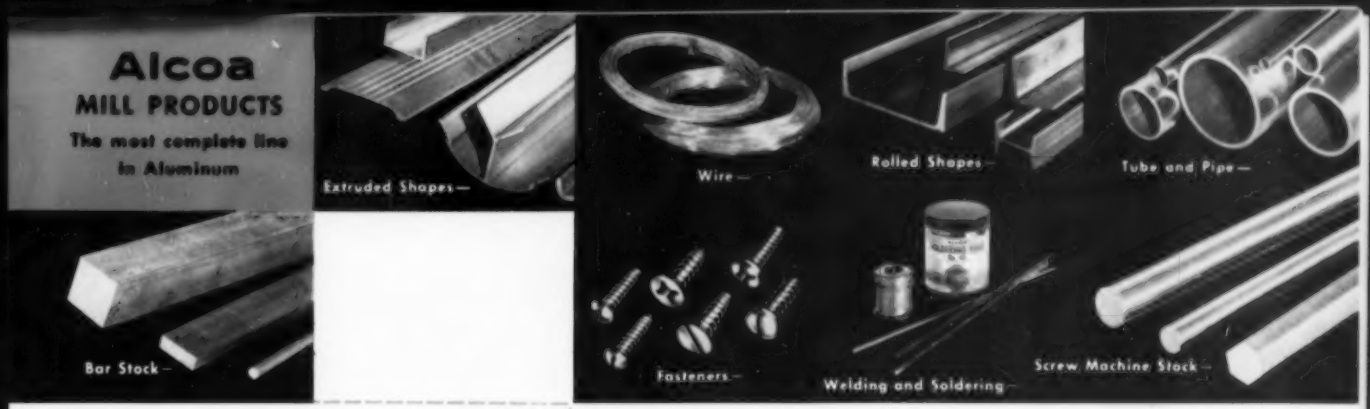
AIRLESS BLASTING is being used at Michigan Precision Molded Inc. to etch small steel stampings before rubber rings are bonded to them.

Parts are oil sealing rings for automotive, industrial and farm machinery.

Etching—Rings with a typical size of 2-7/16-in. diameter by 3/8 in. thick are etched at a rate of 25,000 per 8-hour day. The work is done in a Tumblast machine, a product of American Wheelabrator & Equipment Corp. Loads of 2000 pieces are etched in 10 minutes.

Blast cleaned surfaces have been found excellent for strong bonding. Ring tolerances of ± 0.0015 or 0.002 in. are not destroyed or altered during etching. Maintenance of these tolerances is critical.

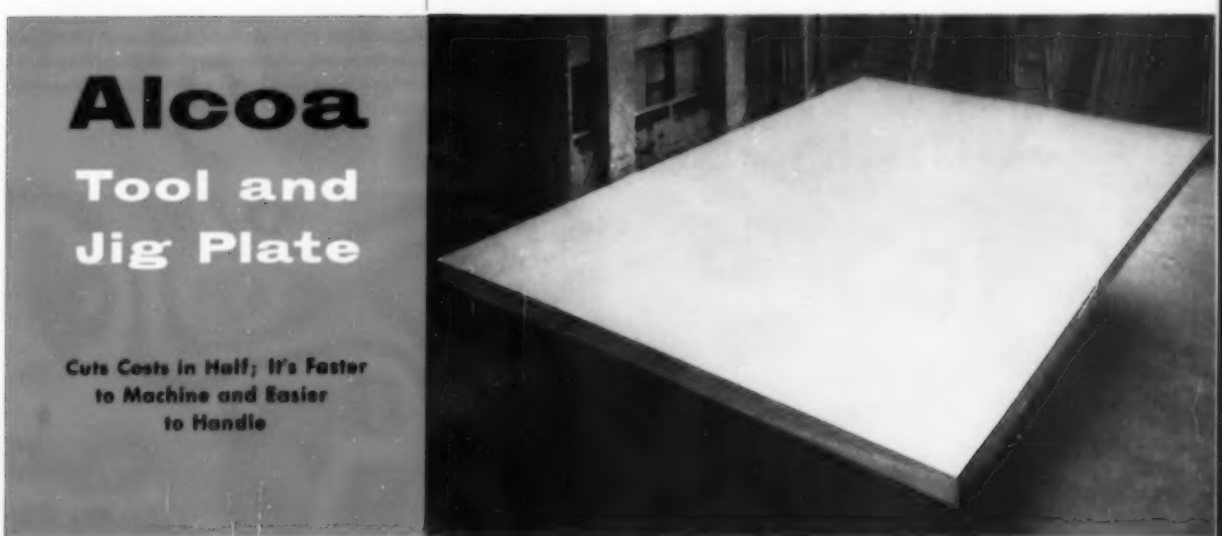
Airless blasting is a simple process, mainly because it does not require the complicated technical control needed to chemically etch bonding surfaces.



Assembly and machining fixtures, jigs, forming dies, pattern plates and low-pressure molding dies for rubber and plastic cost only half as much when you make them from Alcoa® Aluminum Tool and Jig Plate instead of steel.

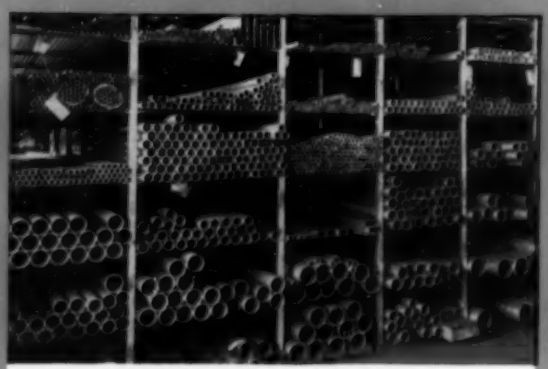
Your savings start with the low cost of the material and mount rapidly through faster machining and the easy handling made possible by light weight. Alcoa casts Tool and Jig Plate in 11 different thicknesses from $\frac{3}{8}$″ to 4″ and makes it available to you from stock in any dimensions up to 48″ by 96″. Fully normalized plate is machined on both sides to hold thickness to ±.010″.

Many manufacturers are turning to Alcoa Aluminum Tool and Jig Plate for the major economies it affords. It's another of Alcoa's Mill Products, the most complete line in aluminum, designed to help you get faster production at lower cost. Your local Alcoa sales office will provide detailed counsel from the world's greatest fund of aluminum knowledge.



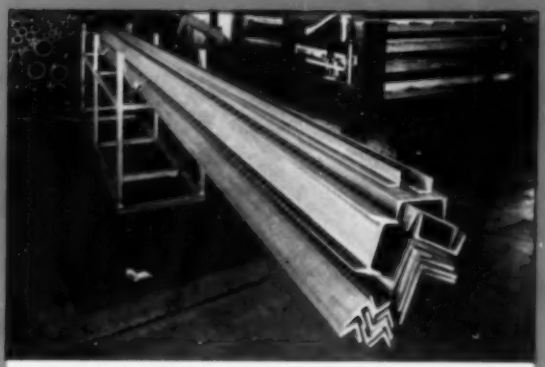
Products of Sixty-Five Years of Pioneering in Aluminum

EXTRUDED SHAPES: For thresholds; window sills; door frames; glass stops; copings; gravel stops; trim; truck bodies. Also angles; channels; tees; zees; etc., for structures.

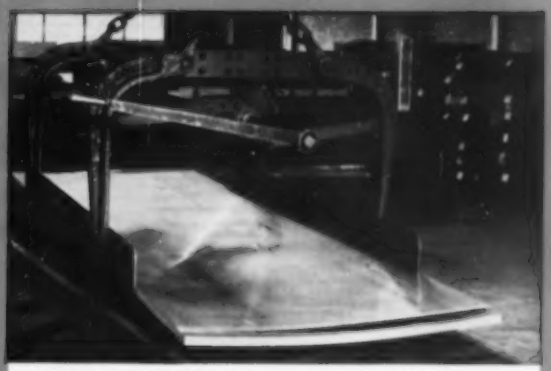


TUBE AND PIPE: Coiled tube; Alcoa® Utilitube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.

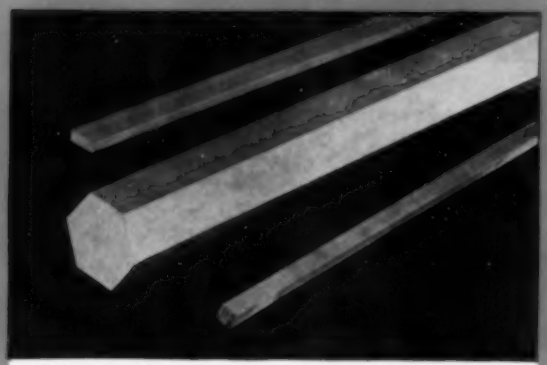
WIRE AND ROD: Coiled and straight length; flattened wire; rivet wire and rod for die heading operations in manufacture of rivets, nails, bolts and screws.



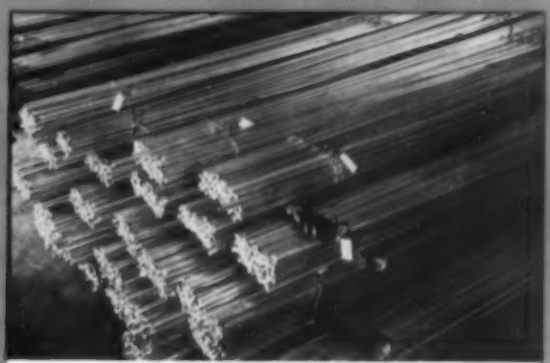
ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; tees; zees. Suited to a variety of structural applications.



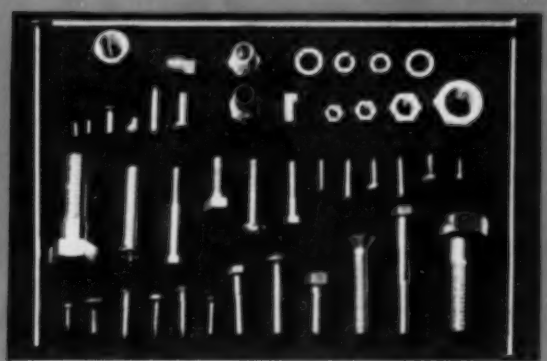
SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.



BAR STOCK: Square, hexagonal and rectangular in all commercial alloys. Rolled and cold finished to final dimensions for superior tolerance and finish.



SCREW MACHINE STOCK: Available in 11S-T3, the free-machining alloy and 17S-T4, a higher strength alloy plus 24S, 61S and 75S.



FASTENERS: Machine screws, wood screws; washers; nuts; bolts; rivets. Recommended for fastening aluminum to prevent electrolytic damage.

WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.

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Your Alcoa Distributor is as near as your telephone and his warehouse is stocked with the aluminum products you need for fast, economical production. His facilities include modern equipment for sawing, shearing and slitting stock to your specifications and for making prompt deliveries.

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Marsh Steel Corporation
Metal Goods Corporation
CONNECTICUT
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see our catalog in PLANT ENGINEERING FILE or write for copy

NEW ALLOY DESIGNATIONS

Under the new alloy designation system effective October 1, alloys shown under screw machine stock on the preceding page will be designated as: 2011-T3 (formerly 11S-T3), 2017-T4 (formerly 17S-T4), 2024, 6061 and 7075 (formerly 24S, 61S and 75S).

TWO NEW "HOW TO DO IT" FILMS

New Horizons in Aluminum Brazing and *Welding Advances with Aluminum*. Both 16 mm. with sound and full color. Your distributor will arrange bookings. Ask him now!

Your local Alcoa sales office is a ready source for counsel on special applications of aluminum. You'll find the number in the yellow pages of your classified telephone directory. Or write: ALUMINUM COMPANY OF AMERICA, 876-E Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

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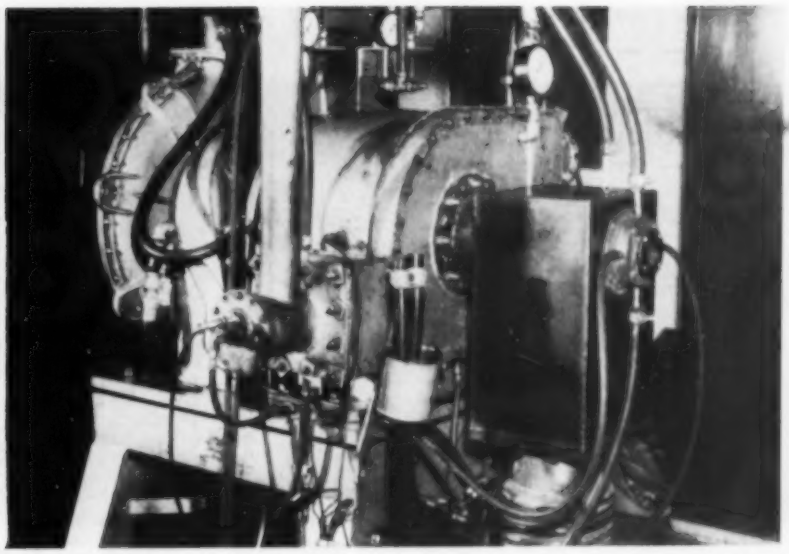
An efficient turbine with this seven-inch diameter Kentanium impeller operating at 1800 to 1900° F would deliver 125 hp



Test assembly. Turbine is located in center water-jacketed housing. Set-up was tested for 100 hours at 30,000 rpm

Breaking the Heat Barrier . . .

Turbine Defies Beyond-Jet Temperatures

Kennametal tries its Kentanium for a gas turbine impeller. Finds on a test that it stands up at temperatures 300°F hotter than present gas turbine ceiling

IT'S A MATTER of degree.

Jets and gas turbines now operate in the 1400 to 1600°F range. Step up that range 500°F and their power output would triple! But today's metals can't stand the gaff.

Kennametal Inc., Latrobe, Pa., is attacking the heat barrier with its Kentanium, a sintered titanium carbide. The material, molded into a gas turbine impeller, has withstood a 100-hour test at 30,000 rpm in the temperature range 1850 to 1900°F. Now they're talking 2000°F.

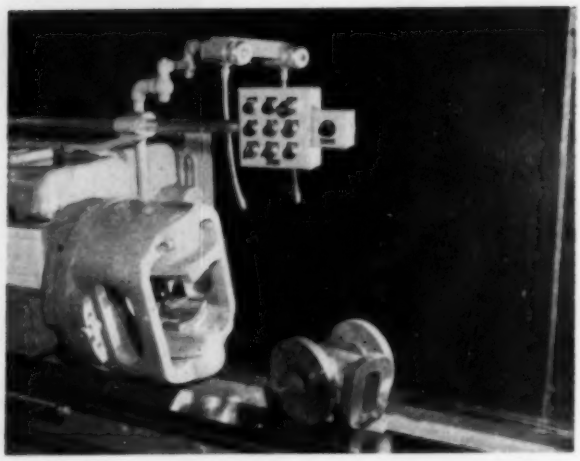
Cermets an Answer—Engineers are looking to such materials (called cermets) to solve a lot of high temperature problems. The combination of high melting substances (refractories) and metals (they supply ductility and heat conductivity) makes the material resistant to heat shock. Kentanium is just one of them. Others are metal-bonded borides, nitrides, aluminides, silicides, oxides and other carbides.

One of the most crying needs for higher temperature materials is in the turbines of turbo-jet and gas turbine engines. A material that works in one will probably check out in the other. Both are subject to the same limitations of temperature and stress.

Turbine Test—For the Kentanium test a special turbine was built—two combustion chambers and a water cooled exhaust system. A compressor adapted from an aircraft supercharger was hooked up to the turbine shaft to impose a load on the turbine.

After operation under full load for 100 hours, at temperatures between 1850 and 1900°F, the impeller showed little change. Yet it must withstand the highest temperatures and is the turbine's only moving part. Engineers point out that had the turbine been in the engine of a jet plane, it would have driven the plane 75,000 miles during the 100 hours at an average speed of 750 mph. As a truck power plant the turbine test would have corresponded to thousands of hours of operation, since the vehicle would operate at full power output for only a small part of the time.

This typical shop view shows a line of turret lathes producing various sizes of gate valves and component parts



This close-up of a five-position indexing fixture shows how it will swing to expose the surface to be machined

Indexing Fixtures Solve Valve Production Problems

Indexing fixtures add to the versatility of the turret lathe—permit more complete machining job in a single chucking. Concentricity is one benefit

INDEXING fixtures on turret lathes are a solution to gate valve production problems.

Indexing types permit some or all operations to be performed in a single chucking of the valve body; and the correct relationship between all diameters and faces is assured.

Five-Position Fixture—An example of a complicated fixture is the five-position unit, above right. It has three 90-degree indexes to permit machining the three flanged faces of the valve body. The fixture also can be indexed 5 degrees either side of center and offset from center—for boring, facing, relieving and threading work on the valve seat, plus screwing-in and finish-facing the valve seat and rings.

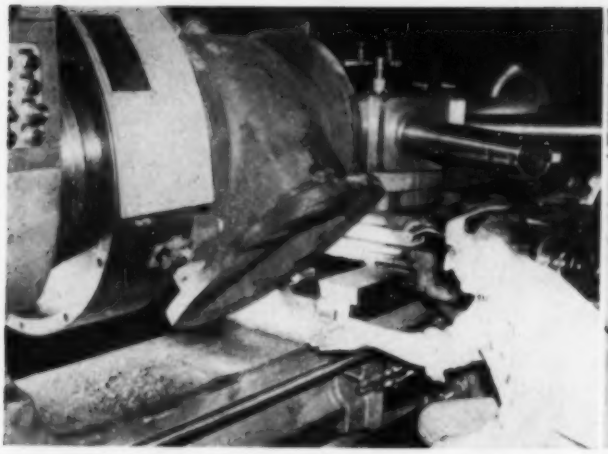
The relationship between machined surfaces is as accurate as indexing and setover of the fixture.

The fixture shown uses a pop-pin and index plate for each 5-degree position. Exact angularity on each side of center is obtained and the amount of setover is duplicated in each successive operation. Cumulative error is avoided because all work is done in a single chucking.

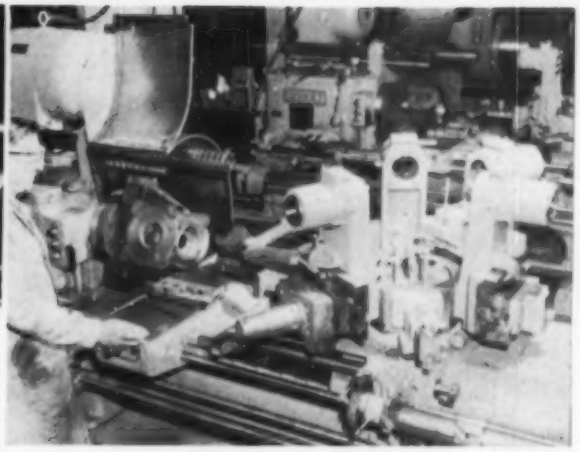
Controlled Torque—Use of the electric clutch and brake makes it possible to use a controlled amount of torque for screwing in the valve seat rings. The operator has only to adjust the torque control switch, position the seat ring and hold it with a special driver mounted on the hexagon turret while the spindle rotates.

When the ring seats, controlled electric clutch slippage permits any desired amount of torque to seat the ring securely and solidly.

Combination Chuck — One cast iron gate valve manufacturer uses a Gisholt 4L saddle turret lathe for machining. Work is held in a 32-in., four-jaw combination chuck operated by a power wrench equipped with a solenoid-operated safety latch.



Gapped bed on this machine makes it possible to swing a 49-in. workpiece a distance of 36 in. from spindle flange



Automatic turret lathe machines various plug valve sizes. Finish taper boring slide is cam controlled on this unit

This machine has a special gapped bed that swings 49 in. for a distance of 36 in. from spindle flange, above left. Size and variety of work to be handled mean both headstock and hexagon turret are raised. This machine has no side carriage and the cross-feeding hexagon turret is used to full advantage to perform operations otherwise handled by tools on the square turret.

The valve body is held for chucking with a pusher unit mounted on the hexagon turret and centralized in the bore on a tapered spring-loaded unit on the chuck face. Using cross feed, at station two the seating faces for the seat rings are machined. Using cross feed, forward and reverse feed, station three rough and finish bores the seat ring opening to proper thread diameter and chamfers the edges.

A chasing attachment is used with the tools on station four to cut the threads. After rings are screwed into the valve body by the flange-mounted arbor and driving head, station six finish-faces and chamfers the seat rings.

Automatics, Too — Automatic turret lathes also are used for valve production. One user machines cast iron and steel plug valves in a number of sizes on a model 2F Fastermatic automatic turret lathe, above right.

The first turret station has a loading arbor to carry the work into proper chucking position. Four or five additional chucking stations are used, depending upon the kind of valve body being machined. The tapered seat for the plug is rough and finish bored with single, horizontal slide tools mounted on the hexagon turret.

Slides are moved by an angular cam mounted on the front cross slide and forced tightly against the cam by sustained air pressure on a pusher bar mounted on the rear cross slide. In addition to the tapered seat, there are boring, facing and—on some workpieces—grooving operations to be done. A single operator handles two machines easily.

Simple Changeover — Another manufacturer handles four valve body sizes on a model 1F. Changeover between sizes requires different spacers in the holding fixture, individual drills and boring bars, etc.

Parts are held in an angle plate fixture mounted on the face of a special, lever-operated aluminum-body air chuck. Due to weight of the fixture, the machine spindle, chuck, fixture and rough workpieces were balanced as a unit prior to assembly.

Sequence — Machining begins with a boring bar sizing the cored hole in the casting. Bar penetrates only deep enough to give the core drill a true start. Core drill is used to rough out the bore, then other tools follow to counterbore, face and chamfer.

Finish boring is performed by a conventional bar mounted on a slide tool and so arranged that an overhead stop bar cams the slide and tool up toward the spindle centerline at the end of the cut. This movement permits the tool to be withdrawn without leaving tool marks in the bore.

Tools on the front and rear cross slides rough and finish face while machining is performed from the hexagon turret. The rear slide handles finish facing and is equipped with hydraulic tool relief. At the completion of the finish facing cut, the slide tips away from the work several thousandths of an inch to permit the tool to clear as the slide retracts.

Again, all valve body machining operations are performed automatically. One operator can handle two machines.

Next week STEEL will summarize new minimum standard for steel castings sponsored by Steel Founders' Society of America.

Coated metal is heat treated at high temperatures. Scale is converted, then pickled in modified solution

Experimental coat of titanium is usually applied by dipping. It may be sprayed or brushed on

Precoating Provides New Approach . . .

Descaling Titanium and Stainless Steel

Process that makes scale easier to remove or inhibits its development may replace use of molten salt baths or mechanical descaling for some metals

ANOTHER way to descale titanium and stainless takes its place with salt bath immersion and mechanical methods as a result of work by Boeing Airplane Co.

The two processes call for application of a beneficial substance to the metal before heat treatment. The substance inhibits scale formation or converts normal scale to a form more convenient to remove, according to Bryce Chambers, Boeing engineer.

Titanium — Certain carbonates combine with certain nitrates, to furnish an effective crystalline coating on the metal, when it is subjected to higher-temperature heat treatment. Nitrates act as oxidizers to convert normal scale oxides into one of high oxygen content or different crystalline structure.

Carbonates convert the normal scale oxides or higher oxides into a titanate form, which is also not tenacious.

Off It Comes—Upon cooling, the scale can be removed by rubbing or a brief pickle in a modified conventional nitric-hydrofluoric acid solution.

The only detriment is the slight etching that might accompany the process. Finished surface is weldable. No intergranular corrosion occurs.

Inhibits—AISI 310 and 17-7 PH were the stainless grades used on this different approach. Certain silicon bearing substances decompose in the furnace and deposite a rather thick coating of finely-divided silica. It can be rinsed or brushed off. The barrier formed markedly inhibits oxidation on the metal's surface.

But effectiveness is limited to the extent of heat treating temperatures. At a temperature of 2100° F, a relatively greater chemical potential exists between the metal surface and the oxygen present. More oxygen will penetrate the porous silica barrier. Amount of scale formation is also dependent on the characteristics of the alloy used. Some are prone to form more troublesome scales at lower temperatures because of phase transformations.

Two Ways — Because heating temperatures of stainless steels are higher than those of titanium, the method used on the latter failed with stainless. Most of the compounds melted at the high temperature before any good was done. Though the inhibiting method works well with 17-7 PH and others, it appears inadequate with AISI 310 stainless.

10 cold-finished
JALCASE
grades
J&L
STEEL
MEMORANDUM
Here's another new book by J&L...you'll want it for your reference material
NOTE:
Data on J&L's Jalcase include information on the superior machinability of this cold finished steel. Both speed of machining and the amount of metal removed per revolution can be substantially higher than with other steels of approximately the same mechanical properties.
Jalcase also gives longer tool life between grindings. In many cases the machined surface of a Jalcase part requires no subsequent finishing operation.

You can help us place a copy of this *new* book in your hands. Please give us your name and address. We'll do the rest. It will be *mailed* without cost to you—no intrusion on your time.

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3 Gateway Center, Pittsburgh 30, Pa.

Please send me a copy of your new Booklet, "10 Cold Finished JALCASE Grades."

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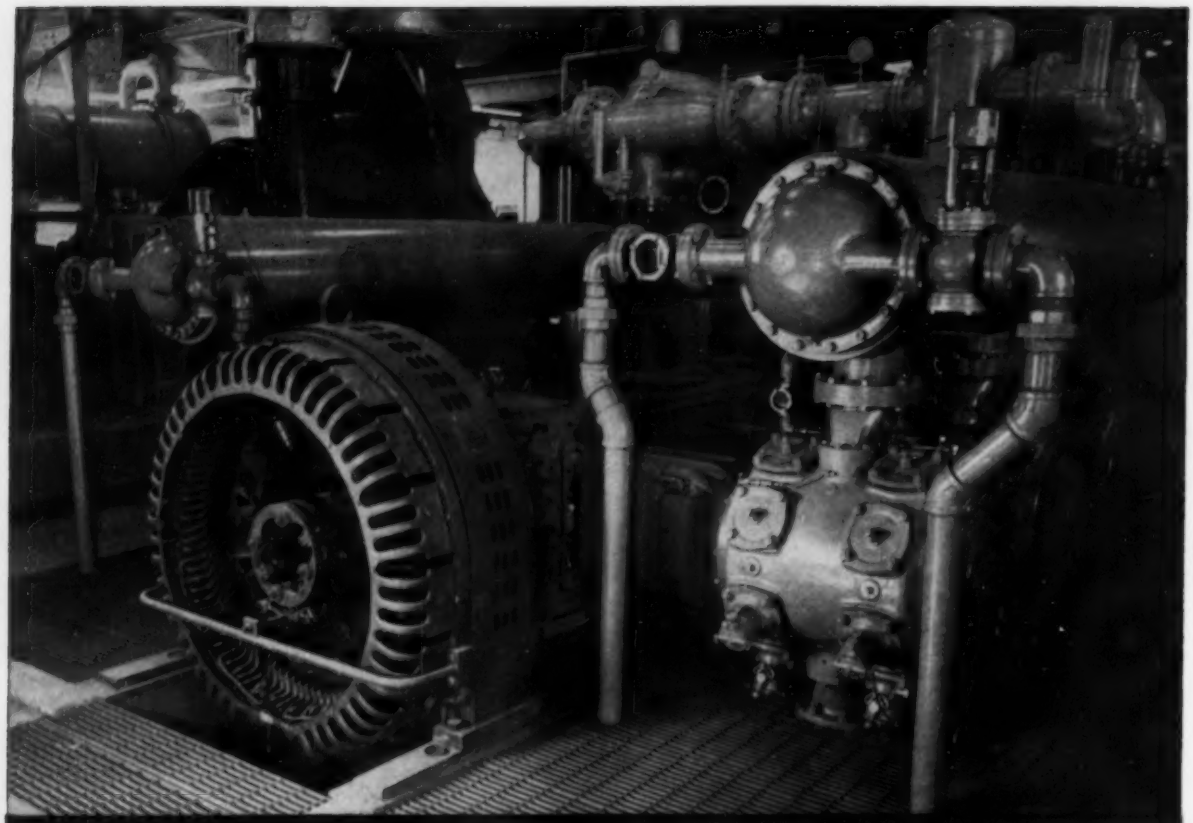


CLARK BALANCED/OPPOSED COMPRESSOR

Used for testing jet components in Bendix Aviation's new research center

Speeds up to supersonic levels! Atmospheric conditions ranging from sea level to 80,000 feet! Temperatures from minus 100° F. to plus 800° F. These are the conditions at which Bendix Aviation Corporation's new research facility at Teterboro, N. J. can test component equipment for jet aircraft and missiles.

Destined to save thousands of man-hours of engineering research, the new facility utilizes the latest combinations of pneumatic and electrical equipment. Playing an important part is a Clark 600 horsepower CMA-6, Motor Driven, Balanced/Opposed Compressor which supplies air at 200 psi for test purposes.

Because of the nature of the operation, perfect balance and accurate match of supply to demand, through flexible compressor cylinder loading, were important considerations in the selection of a Clark unit. Compactness saved considerable floor area.

A complete Clark line of Balanced/Opposed Compressors in the 150 to 4500 horsepower range is available in various cylinder arrangements to meet practically any requirement. A Clark representative will gladly furnish complete details. Write for Bulletin 118.

CLARK BROS. CO. · OLEAN, N. Y.

ONE OF THE DRESSER INDUSTRIES

Sales Offices in Principal Cities Throughout the World

PRECISION BY THE TON

CLARK

compressors

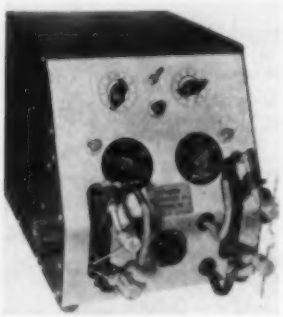
NEW PRODUCTS and equipment

Reply card on page 119 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Resistance Welder

. . . with dual heads

This 1-kva, small parts resistance welder can be quickly and independently adjusted for pressure, time and heat in progressive assembly. Electrodes and holders are adjustable in all directions. Sold as complete package (welding heads, timers, controls and transformers in a specially-constructed cabinet) it handles strip and wires up to 1/32 in.



Air cooled, ⅛-ft or 3/32-in. electrodes are used that maintain constant pressure on work regardless of pedal movement and force. Knob at front of cabinet permits fine adjustment of heat. The unit operates from any conventional 220-volt, 60-cycle, single phase outlet. Royson Engineering Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Nonflammable Solvent

. . . for metalworking industry

Chlorothene, according to Dow, fills the industrial need for low-toxicity, in cold cleaning and cold degreasing operations.

Although 1, 1, 1-Trichloroethane by itself may corrode aluminum and aluminum alloys, the inhibited grade virtually eliminates such corrosion except under most drastic conditions. The product will be marketed on a freight allowed basis. Dow Chemical Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Film Tape

. . . 2 mils thick

Pressure sensitive, it possesses unusual strength. Made with a polyester film backing, with red, black or white color pigments in the adhesive, it is highly resistant to acids, alkalies, ketones, hydrocarbons, esters and other solvents.

Other properties include 25-lb tensile strength per in. of tape width, 100 per cent elongation and 35 ounces adhesion per in. of width. It retains its flexibility at low temperatures and has high dimensional stability despite heat and humidity changes. Minnesota Mining & Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Motor Generator Control

. . . deep penetration heating

This control and heating station is designed for forging, hardening, brazing or annealing.

Output transformer can be installed or removed through either front or rear of station. A system of Checklites maintains constant control on operating conditions of the motor generator and work stations. Unit, housed in steel cabinet 39 x 39 x 76 in. in size, weighs about 2000 lb. Motor generator sets with frequency cycles of 960, 3000 or 9600 and power inputs

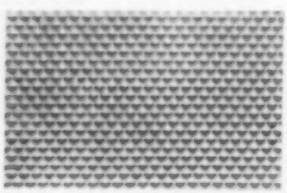
ranging from 50 kw to 1250 kw are available for use with the station. Operations can be timed automatically by 4-circuit synchronous timer. Lindberg Engineering Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Engine Turn Pattern

. . . hides surface impressions

Moving highlights produced can be viewed from any angle. The



light pattern has a maximum depth of 0.025 in., yet provides a decorative, prefinished surface that resists marring, hides scratches and

DANLY

Blanking

COSTS LESS ON A DANLY PRESS

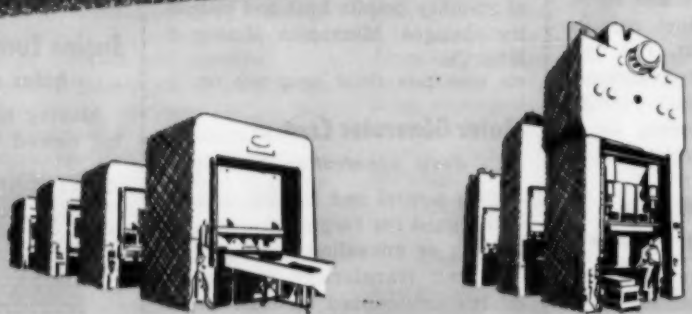
Unique new features, engineered for dependability, increase production

Now, blanking costs can be lower than ever before whether your operation calls for high speed lamination stamping at 400 strokes per minute or producing big blanks from coils or sheet.

Why? Because Danly's heavier construction gives reserve strength to meet the demands of continuous peak load operation. Exclusive Danly electrical and pneumatic controls make automation of auxiliary equipment easier and faster . . . saving setup and change-over time. Extra rigidity increases die life. Automatic oil lubrication assures dependable performance and low maintenance costs.

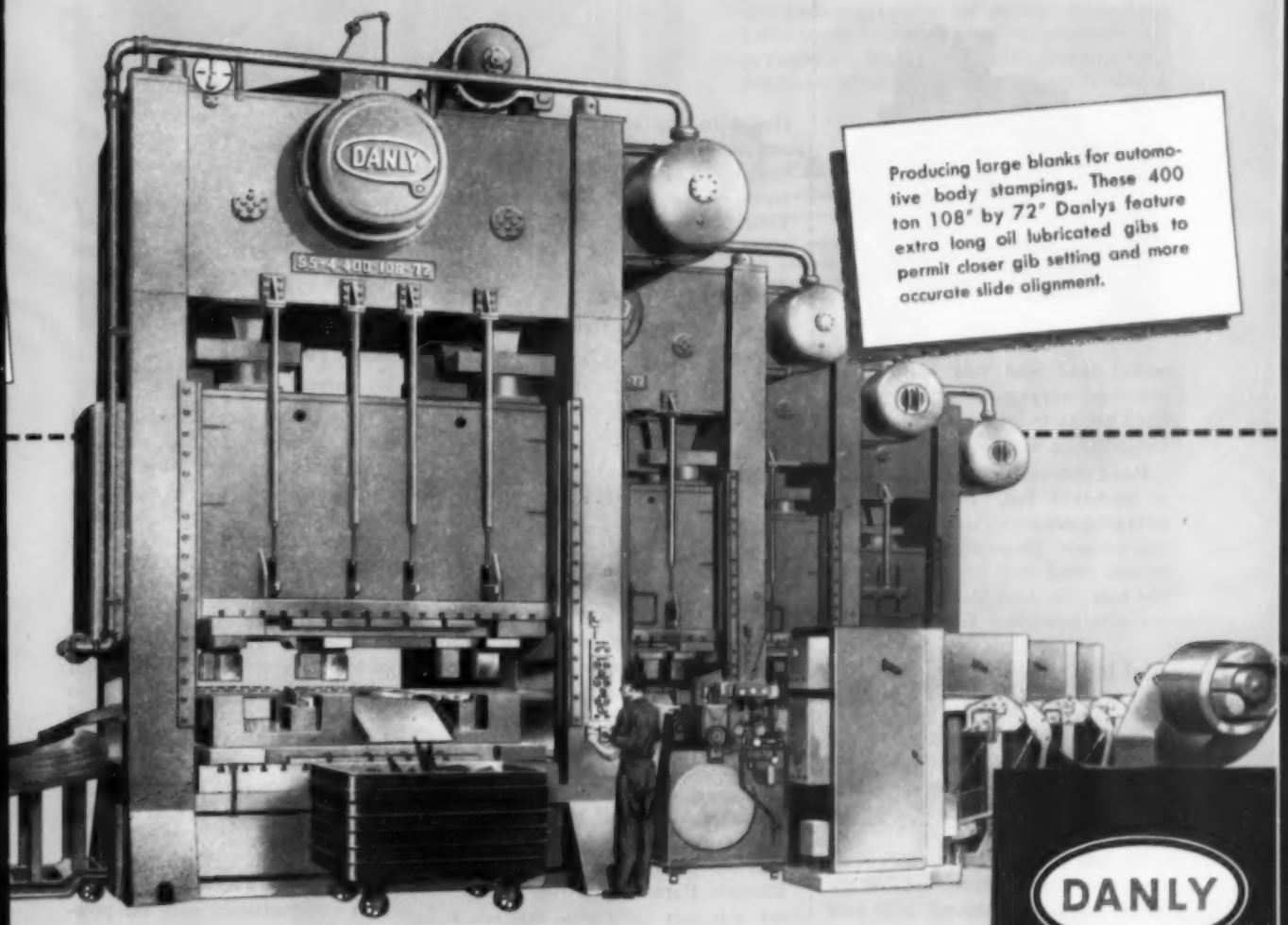
Whether you are expanding or replacing facilities, it will be worth your while to talk to a Danly Press engineer.

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue, Chicago 50, Illinois



Danly offers any press you need for blanking, drawing or any secondary operation... single, double or triple action... overdrive or underdrive . . . to suit your plant layout. Make your press line a Danly line and save costs at every stage of your stamping operation.

High speed production of transformer core laminations. This 150 ton Danly Autofeed produces 45,000 parts per eight hour shift.



Producing large blanks for automotive body stampings. These 400 ton 108" by 72" Danlys feature extra long oil lubricated gibs to permit closer gib setting and more accurate slide alignment.

DANLY

fingerprints and reduces glare. It fabricates as easily as plain metal, using conventional techniques and machines.

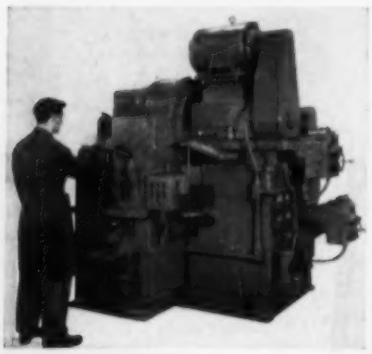
It is available in stainless steel, aluminum, carbon steel, brass, copper and all other ferrous and nonferrous metals. It comes in widths up to 7 in. in sheet, strip or coil, solid or perforated. Rigidized Metals Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Two-Head Grinder

. . . with horizontal spindle

A heavy welded steel base supports the two head slides upon dovetailed ways. Hardened and ground steel plates serve as races for precision-sized ball bearings. Each spindle is 3.937 in. in diameter at the wheel collar end, with double roller bearings taking the



radial load and two ball thrust bearings carryng thrust load. Each head pivots to adjust angularity of the grinding wheel.

Head slides may be automatically or manually fed. Power-operated swinging dressers employ ball bearing cutters. Dressers are enclosed within head and are mounted at the rear. Gardner Machine. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Dial Indicator

. . . has 2-in. range

Model D81T, size 2¾ in. in diameter, follows American Gage Design Committee specs, except for length of stem, dust cap and rack.

It has two revolution counters; one counts revolutions of the large hand, the second tells how many times the first revolution has been around. It will measure two full inches in increments of 0.001.

Pullback spring is completely en-

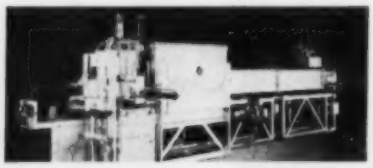
closed in the case, making horizontal or vertical positioning of the indicator possible. Basic features of regular line are included. Federal Products Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 7

Pusher Type Furnace

. . . bright-brazes stainless

This completely automatic machine brazes at temperatures up to 2150° F and is adaptable for continuous brazing stainless with cop-



per or stainless steel brazing compound. It maintains dry hydrogen atmosphere and uniform heat distribution.

Sequence of operations is automatically timed and synchronized for continuous production with one-man operation. Self-contained, the unit is engineered for integration in production lines. Harper Electric Furnace Corp.

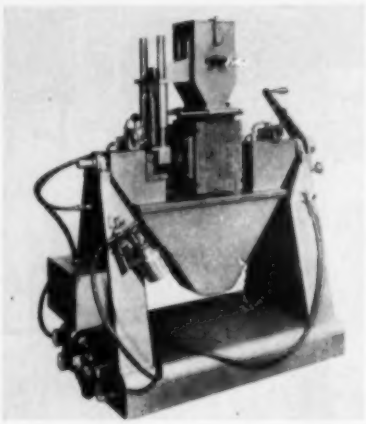
FOR MORE DATA CIRCLE REPLY CARD NO. 8

Shell Core Machine

. . . sand, permanent molds

This machine incorporates built-in heater plates that complete curing in the machine. Fully automatic core box temperature control is provided by a thermostat and magnetic contactor. The core boxes may be changed in a matter of minutes.

The operating cycle is said to be extremely simple. A completely cured shell core is delivered every 30 to 50 seconds, depending on



core size. With multiple cavity boxes production is proportionately higher. Shalco Engineering Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 9

Electric Fork Truck

. . . spread is adjustable

The Warehouser Extend-A-Load electric fork truck has a 2000-lb capacity at its 24-in. load center. Capable of short radius turns, it can reach out and pick up or deposit a load at any height from floor level to 26½ in.

Fork spread is adjustable from 12 in. to 26½ in. The loads are extended and retracted by a hydraulically powered pantograph device which is actuated by two double acting cylinders operated by a conveniently located pushbutton control. The controls, which are used to hoist, lower, control direction of travel and accelerate the truck, are grouped for one hand operation. The truck is equipped with a deadman control which automatically cuts off pow-

...solid foundation
FOR TODAY'S COMPACT MOTOR DESIGN
There are, as you know, new NEMA Standards for electric motors ... more power in less space
When you look for a new NEMA frame motor, look for the one that is built on a solid foundation ... it carries the Fairbanks-Morse Seal of Quality.
The Standards are new .. But the Idea Is Not
Like the recent Fairbanks-Morse developments in other lines, the new F-M motor is the result of a basic engineering philosophy: More Performance in Less Space—a 120-year tradition at Fairbanks-Morse. Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois
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NEW LOCOMOTIVE DESIGN
NEW GENERATOR DESIGN
NEW SCALE DESIGN
NEW DIESEL DESIGN
NEW MOTOR DESIGN
NEW MAGNETO DESIGN
NEW PUMP DESIGN
NEW

er and applies brake when the operator leaves the truck. A tilt feature provides for an automatic backward tilt of 2¼ degrees insuring stability of load in transport. Yale & Towne Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Quick Fastener

. . . blend, self-retaining

The Q-4 quarter-turn fastener offers easy installation and faster servicing. A blind fastener, once snapped in place it is self-retaining in the outer sheet or panel.

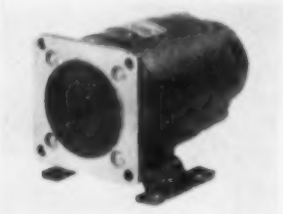
Cost savings with the Q-4 have been made on a material basis alone. Sizes are available to accommodate various panel thicknesses. Samples and complete engineering data are available from Shakeproof Division. Illinois Tool Works.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Tachometer Generator

. . . high voltage, dc

It provides a high voltage output of 50v/1000 rpm for speeds up to 5000 rpm and 100v/1000 rpm for speeds up to 2500 rpm. Appli-



cations include measuring and controlling speed in the manufacture of steel and aluminum, wire-forming machines and machine tools.

Totally-enclosed, it can be flange or foot mounted to be direct-coupled, geared or belt-driven. Capable of being mounted horizontally or vertically, it is equipped with a conduit box with ½-in. straight pipe thread that permits conduit if desired. Shaft extension on pulley end is 5/16 in. in diameter, 15/16 in. long, with a flat section and stub shaft on the opposite end for hand tachometer measurement. General Electric Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 12

Welding Unit

. . . for light gas welding

It consists of a full 80-cu-ft oxygen cylinder, a full B acetylene cylinder and the accessory group, torch and tips, regulators, twin hose, goggles, wrench and file lighter. Combined weight is 17 lb. Additional equipment is optional.

Harvey Aluminum developed the unit with Burdett Oxygen Co. It is intended for use on all commercial aluminum alloys. Burdett Oxygen Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 13

Battery Racks

. . . takes all types

Suitable for all makes of storage batteries, in all applications where emergency power is needed,

a completely redesigned line of steel battery racks is fabricated from structural steel with double-brace frame uprights and welded joints throughout. Rail deflection under heaviest battery load is less than ⅛-in.

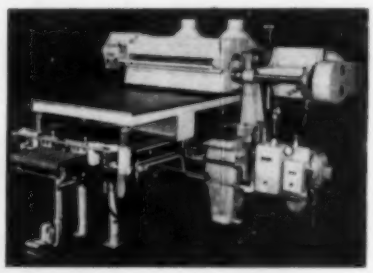
Cell pads are replaced by a cushioning plastic sleeve which eliminates need for repainting top rails. Four basic designs are available: Single row, one-tier; single row, two-tier; two step; three step. Electric Storage Battery Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

Surface Finisher

. . . with vacuum chuck

A modification of an earlier machine, Model 203-C's completely new electrical control circuits offer a wide choice of automatic or semi-automatic cyclic actuations. A side oscillation mechanism is at mid-table.



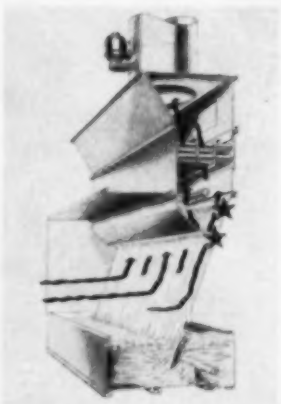
Added capacity comes with a 40 x 48-in. vacuum table. Failure of negative pneumatic chucking pressure stops the machine. The floating buff will follow curvature of work at any uniform preset contact pressure. Speed of table travel and buff pressure are adjustable. Clair Mfg. Co. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Spray Booth

. . . for general use

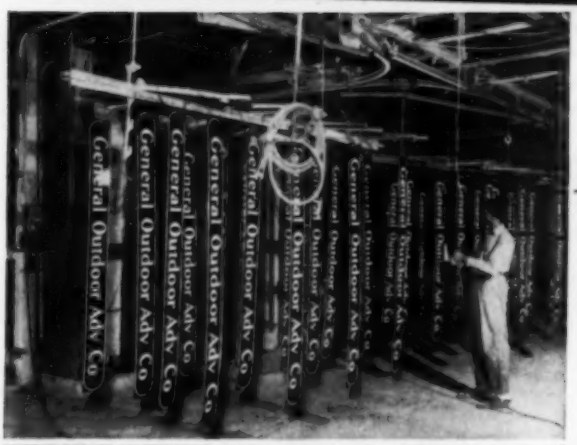
Style D Booth draws overspray and fumes from painting operations through two separate, thor-



ough washing operations. The velocity of air passing through the wash chamber never exceeds 600 fpm, utilizing the full efficiency of the water action. This scrubs the atomized paint pigment and vehicle from the air and deposits them in the collecting pan below.

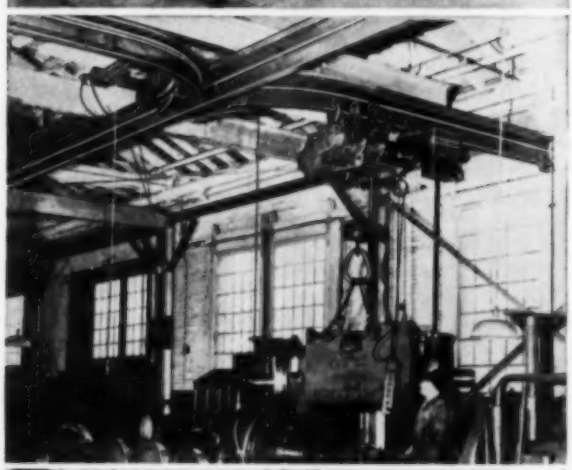
Operating and maintenance costs

what MONORAIL can do . . .



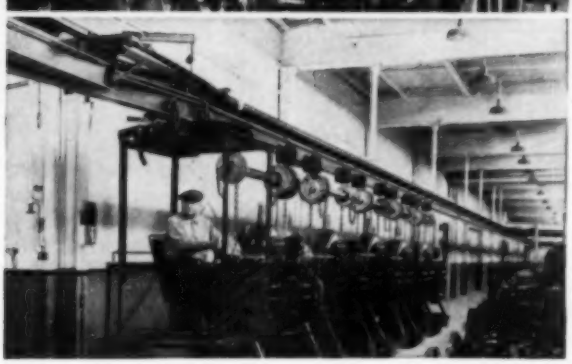
WHERE SPACE IS LIMITED

MonoRail relieves operating congestion by transferring materials handling to unused overhead area. Equipment can often be installed with no loss of production.



TO MOVE VARIABLE LOADS

Any size or shape of load, within the capacity of a MonoRail system, can be moved by using slings, grabs or other quickly changed "below the hook" devices for hand or electric operation.



FOR LOW MAINTENANCE COSTS

American MonoRail equipment is specially engineered and carefully built for long-life, rugged service. Manual or automatic operation continues with little or no downtime for maintenance or repair.

Send for Bulletin C-1 illustrating hundreds of successful MonoRail installations.

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13102 ATHENS AVENUE • CLEVELAND 7, OHIO

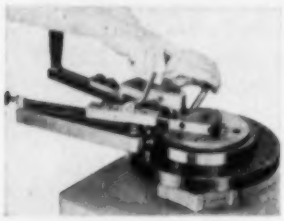
are said to be low. Valuable floor space is saved. The over-all depth of the booth is small (standard sizes range from 4 to 20 ft in wdth and 7 to 12 ft in height). Binks Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 16

Clamping Device

. . . for any radius

The Quik-Lok can be adjusted for any radius to 2 in. on the No. 1 model and 6 in. on the No. 1A model Di-Arco Bender. It will handle stainless steel tubing up to ½



in. in diameter, round steel bar to ⅝ in. One tube clamp block of specified diameter is included as standard equipment.

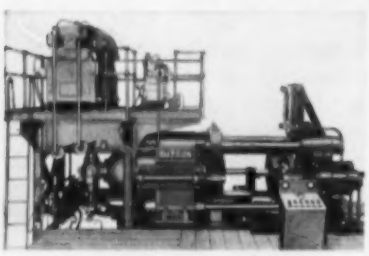
The device is said to be valuable when forming tubing, angle, channel and extrusions on the benders. O'Neil-Irwin Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 17

Extrusion Press

. . . horizontal, direct-powered

The 750-ton unit will take a preheated aluminum, brass, copper or magnesium billet 4 7/16 in. in diameter and extrude solid strips, rod and hollow or semi-hollow sections.



Features include: Extra fast cycling, positive billet loading, easy die change, heavy duty shear or extra high capacity, sensitive control of main ram.

Emphasis has been placed on more pay load, less maintenance, ease of operation and rugged construction. Sutton Engineering Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 18

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 119 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Electroplating

Hanson - Van Winkle - Munning Co.—A 4-page bulletin on its electroplating process describes and lists key characteristics of 16 processes and the 10 services available to their customers. Provisions made for customers to train platers, test processes and equipment and advise on setting up and sequencing metal finishing operations are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 19

Materials Handling

Towmotor Corp.—Job Study, No. 117, gives details on the Bigelow-Sanford materials handling problems as they existed and as they were solved. The data can be applied to any industry where handling of heavy, bulky material is required in receiving, production, warehousing and shipping operations.

FOR A FREE COPY CIRCLE REPLY CARD NO. 20

Sweepers

Homer Mfg. Co. Inc.—4-page Bulletin MS-250 describes and illustrates in detail uses, advantages, operational information and specifications of their line of magnetic hand and road sweepers used to remove tramp iron and other magnetic materials.

FOR A FREE COPY CIRCLE REPLY CARD NO. 21

Tin Uses

Tin Research Institute—Directed to develop the use of tin, a range of information is offered in *Tin and Its Uses*. Topics covered are: Evaluation of bearing materials; centrifugal die casting in rubber molds; soldering fluxes. The book contains 55 pages of data on the physical, physico-chemical, atomic and nuclear and metallurgical properties of tin.

FOR A FREE COPY CIRCLE REPLY CARD NO. 22

Directional Valves

Parker Appliance Co.—Dimensional data and features of their hydraulic directional valves for mobile equipment applications are given in a 10-page catalog. 1, 2, 3 and 4-spool models of from 8 to 35-gpm capacity are covered.

FOR A FREE COPY CIRCLE REPLY CARD NO. 23

Conveyor Belts

American Brake Shoe Co. — Electro-Alloys Division offers a bulletin describing the manufacture and testing of their Thermalloy general purpose belts and one for heavy-duty service. Drawings show how staggered link design eliminates crank - shafting and evens the load on each link.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Grinding Wheels

Norton Co.—A condensed catalog of the most widely used grinding wheels carried in stock features a supplement of net prices on quantity lots. Grinding wheel selection is covered in considerable detail.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Refractory

Basic Refractories Inc.—"Gunchrome - M", describes their chrome-magnesia base refractory. Illustrated, the booklet briefly outlines the many advantages and uses of the refractory.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Pressure Vessels

United States Steel Corp. — "United States Steel Presents T-1" gives valuable data on pressure vessel construction developed as a result of a series of tests called Operation T-1. The performance of T-1 steel in other applications is covered, intended to demon-

Here's Proof

The New Thompson Type 2F is a

SUPER PRECISION

Tool Room Grinder

WEBBER GAGE COMPANY
12900 TRISKETT ROAD - CLEVELAND 11, OHIO

Mr. Wilson, Vice President
Thompson Grinder Company
Springfield, Ohio

Dear Mr. Wilson:

We recently installed a new THOMPSON Tool Room Grinder to grind Gage Blocks to our specifications and tolerances. The results have been very satisfactory, in spite of the close limits to which the work has to be done. We thought you would be interested in the performance of this machine.

Very truly yours,
WEBBER GAGE COMPANY
George D. Webber

Thompson 2F Grinder Photographed in the Webber Gage Co., Cleveland Plant

COMPARE THIS NEW 8 x 10 x 24 TOOL ROOM GRINDER

When working to a tolerance of four millionths of an inch such as is observed when making Webber Gage Blocks, the rough or preliminary grinding plays an important role in keeping cost of the final finishing within reasonable limits.

Compare These Features:

- HARDENED AND GROUND cross slide ways completely sealed.
- One shot lubrication to cross slide ways and internal saddle bearings.
- HARDENED AND GROUND sealed anti-friction vertical slide.
- HARDENED AND GROUND BED WAYS with automatic lubrication.
- 3600/1800 R.P.M. 2 speed wheel head. Heavy alloy steel spindle heat treated, runs in super precision ball bearings accurately preloaded, lifetime lubricated.

Handy control panel.

- Elevation micrometer stop graduated in .0001".
- GROUND THREAD FEED SCREW.
- Automatic wheel TRUING device.
- Longitudinal hand wheel with automatic engagement.
- Hydraulic head movement throttle with rapid traverse.
- Hydraulic table movement throttle.
- Elevating hand wheel graduated in .0005".
- GROUND THREAD FEED SCREW.

WRITE TODAY for complete specifications and performance data. Address Dept. 16, Thompson Grinder Co., Springfield, Ohio.

The only manufacturer of a complete range of heavy duty and light duty surface and contour grinders for industry.

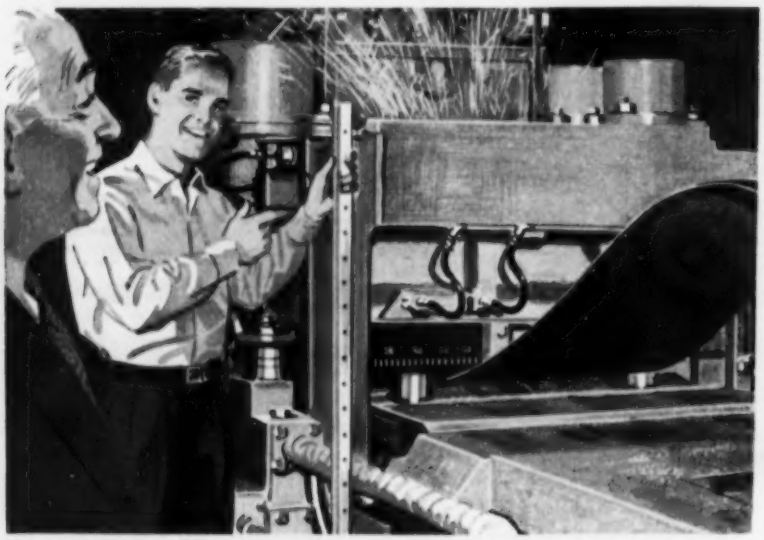
Thompson SURFACE Grinders

The Thompson Grinder Company, Springfield, Ohio

(Advertisement)

If maintenance is your problem
BERYLLIUM COPPER MAY SOLVE IT

THE PROBLEM. Massive flash welders like this are the key to mile-a-minute production of steel strip. They join wide coils together so that they may be continuously fed into the pickling operation. Welders used to be equipped with solid dies made of various electrode materials, but the results were far from satisfactory. The dies picked up flash, and required frequent dressing. They wore rapidly or even fractured under the heavy pounding. Result: heavy maintenance costs, excessive downtime, lowered production.



THE SOLUTION. Many mills, seeking a way to minimize such interruptions and their bad effect on over-all operations, have now redesigned their flash welder dies. The solid die has been replaced by an assembly which uses a fitted insert or electrode made of tough wrought Berylco beryllium copper. The Berylco inserts are capable of taking heavy punishment and do not fracture. They wear better. Flash adherence is reduced, and thus dressings are less frequent. Maintenance costs are down, production is up, and with it all welds are smoother and sounder. Only Berylco, with its combination of electrical conductivity and ruggedness, could have made such results possible.

THIS IS A TYPICAL ILLUSTRATION of Berylco's ability to cut maintenance costs to the bone. The same success might be cited in such products as business machines and home appliances, where beryllium copper parts, large and small, assure continuous customer satisfaction and eliminate expensive service calls. Plan now to build service-free performance into your product with Berylco. For sample material or engineering help, write THE BERYLLIUM CORPORATION, Dept. 4-1, Reading 19, Pa.

Tomorrow's products are planned today—with Berylco beryllium copper

strate its faculty for cutting operating and maintenance costs. 45 pages of detailed text is supplemented with photos, graphs and tables.

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Titanium

Cincinnati Milling Machine Co. —The many magazine articles on machining and grinding of titanium have been reprinted in a single pamphlet, No. M-1866. Charts, diagrams and photos supplement text.

FOR A FREE COPY CIRCLE REPLY CARD NO. 28

Frozen Mercury Process

Mercast Corp.—A booklet of interest to operating executives, design engineers, production and purchasing personnel presents the complete story of use and advantages of the frozen mercury process for producing larger and more complex precision castings. The 8-page booklet is illustrated with step-by-step action photos of the process, plus numerous pictures of finished parts. Engineering drawings and charts are also included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Pumps

Food Machinery and Chemical Corp.—The Peerless Pump Division, to describe and illustrate two types of vertical, encased, close-coupled pumps for handling hydrocarbons, hot or cold water, mild acids, basic and salt solutions, has just issued a bulletin titled "Hydro-Line Pumps." The importance, wide application, flexibility and construction features are covered in detail.

FOR A FREE COPY CIRCLE REPLY CARD NO 30

Blast Cleaning

Pangborn Corp. — Bulletin No. 226 describes the various models of Continuous-Flo Rotoblast barrels available for production line blast cleaning to reduce costs. Illustrations and diagrams are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Alloy Specs

Kaiser Aluminum & Chemical Sales Inc.—A designation sheet to be placed in the previously published *Forming and Bending Kaiser Aluminum*, contains changed alloy designations.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

USE A CARD

FREE CATALOGS and LITERATURE

NEW PRODUCT INFORMATION

INFORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

Forgings

Cleveland Hardware and Forging Co.—Companies needing stock industrial forgings and automotive forgings, or forgings to specifications, will be interested in the 40-page Catalog 19A. Dimensions, details, tables, sizes and specifications of almost every stock forging type produced for the automotive and industrial fields are listed. Part numbers are in sequence, by product and in numerical order.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Variable Delivery Pumps

Oilgear Co.—Their line of Type A Packaged Variable Delivery Pumps for straight line or rotary drive applications is described in the 8-page Bulletin 47010. J.I.C. circuits of pumps for differential and nondifferential systems, symbolic diagrams of straight line and rotary drives and installation dimensions are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 34

Gas Valves

Okadee Co.—Complete data on U. L. approved Okadee valves for liquefied petroleum gas service is contained in Bulletin 54-S. All valves described are of the disc type, both single - seated and double-seated. Other applications—in distribution manifolds, pump lines, bulk plant manifolds, twin-tank transport manifolds and storage tank loading lines—are illustrated.

FOR A FREE COPY CIRCLE REPLY CARD NO. 35

Products Catalog

American Brake Shoe Co.—Their first complete catalog, with emphasis on industrial products, is announced. This 48-page book illustrates representative parts and details physical properties or characteristics. Breakdown is by type of product. Sections are on ferrous and nonferrous castings, bearing materials, sintered metals.

FOR A FREE COPY CIRCLE REPLY CARD NO. 36

Utility Bills

Rateonics Corp. — Substantial savings on electric, gas, water and steam bills for commercial and industrial firms are the subject of a 20-page booklet. "The Rateonics Story" states that many business men pay utility bills without knowledge of minimum rates, metering or billing procedure.

FOR A FREE COPY CIRCLE REPLY CARD NO. 37

Casting Glossary

International Nickel Co. Inc.—Over 150 technical terms common among suppliers and users of ferrous and nonferrous castings are explained. The 36-page glossary is offered to explain terms necessary in promoting greater accord in working out the procurement of satisfactory and improved castings.

FOR A FREE COPY CIRCLE REPLY CARD NO. 38

Dirt, Vapor Removal

Selas Corp. of America—Bulletin No. SC-1047 describes their Vape-Sorber for continuous removal of petroleum vapor, dirt and liquids from compressed air and other gases. Brief descriptions of how it works and what it does are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 39

Production Grinding

Standard Electrical Tool Co.—Several bulletins on this company's products. Catalog AG covers the completely automatic (wet or dry) rotary and surface grind-

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

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6	16	26	36	46	56	66	76	86
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ers; Bulletin No. 212 is on precision machine tool attachments; Catalog No. 44, grinders, polishers and buffers.

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Vibration Isolators

Barry Corp.—A 4-page bulletin, No. 1 R541A, "For Greater Efficiency," discusses two problems: The greater utilization of capital equipment and methods of pinpointing and overcoming sources of inefficient plant and machinery operation. Eight steps to efficiency objectives are covered.

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Recorders

Service Recorder Co.—An 8-page catalog on industrial applications for their recorders explains how the new Model M Electrical Recorder is applied to any type industrial equipment powered by electricity. Mechanical Recorders are also described.

FOR A FREE COPY CIRCLE REPLY CARD NO. 42

Hose Catalog

Boston Woven Hose & Rubber Co.—A catalog in color deals with the company's line of industrial fire hose and fittings. It has construction details and illustrations of the complete line of fire and suction hose, extinguisher tubing and fire hose coupling. Specs for each type are listed in the 8 pages.

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Rotary Table

Vulcan Tool Co.—Their motorized rotary table for lapping and grinding is the subject of an 8-page bulletin. Advantages are covered. Photographs illustrate procedures.

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Dial Timer

Automatic Temperature Control Co. Inc.—Bulletin No. N-80, 4 pages, describes the repeat cycle dial timer, its applications and exclusive features. The bulletin is illustrated.

FOR A FREE COPY CIRCLE REPLY CARD NO. 45

O-Rings

United Aircraft Products Inc.—The Ring Division offers a bulletin, No. 54391, showing applications of their metallic, self-energized O-Ring. Drawings are included to illustrate application.

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Pre-Coated Coils

Andwall Mfg. Co.—This company offers Coil-cote, prepainted coils of aluminum or steel, ready to be fabricated. The complete story of this new product is given.

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Bearings, Bushings Specs

Detroit Sintered Metals—A 4-page folder lists metal specifications for sleeve bearings, bushings and intricate shapes manufactured by powder metallurgy. Typical sizes, tolerances and other technical data are included.

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EDITORIAL REPRINTS

Blast Furnace Operation

Part IV of this series, p. 90, states that reducibility of ores depends upon conditions under which heat is applied and the thermal needs of other reactions. Charles E. Agnew says heat is secondary.

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Budgeting Can Pay Off

Budgeting is a bore . . . until you begin to see how it can bring you economies. John T. Garrity, with the management consulting firm of McKinsey & Co., shows how budgeting for middle management can pay off (p. 52).

FOR A FREE COPY CIRCLE REPLY CARD NO. 50

Flame Heating

Dr. Allen Gray discusses flame heating beginning on p. 86. Precision flame hardening makes it possible to control core property and case relationship, depth and location of the case, as well as specified tensile strengths of the core.

FOR A FREE COPY CIRCLE REPLY CARD NO. 51

Hydrogen and Welding

Part I. Helmut Thielsch, Grinnel Co. Inc., maintains that hydrogen is at the bottom of most weld defects, p. 84. He discusses why and gives some practical ideas for minimizing the difficulties.

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5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
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STEEL
September 27, 1954

Market Outlook

THERE'S only one way steel demand and production can go: That's up.

The market has a wealth of basic strength. You can see that by comparing current production in the automobile and steel industries. Even though the automobile industry—the largest single user of steel—is making 50 per cent fewer passenger cars and trucks than at this time last year, the steel industry is producing only 30 per cent less ingot tonnage.

A LIKELY PROSPECT— If the steel industry can sustain production that well, it ought to experience an uptrend when autos get rolling again. Also favoring an upward movement in steel output is the disappearance of large inventories of steel. For the last 15 months steel consumers have been living to a great extent off their steel inventories. The time is not far away when most all consumers will have to buy at least as much as they use.

INCENTIVE TO BUY— Business as a whole remains good. This suggests that consumers' needs will be at least as strong as they are now. If they have to buy steel for all current consumption rather than depend partly upon inventories, they'll have to step up their pace of ordering. If such a stepped-up pace slows deliveries, you can bet users will try to increase orders enough to rebuild inventories.

OUTPUT RISES—In displaying its basic strength, steel ingot production in the week ended Sept. 26 edged up half a point to 66.5 per cent of capacity. This follows a 2.5-point rise in the preceding week. Output continues to be at the highest level since June. All of the nation's steelmaking districts are not as low as the national average. Half are above it.

How high will steel ingot production go in the fourth quarter? Some steel company presidents think 70 per cent; some think 80 per cent; others believe it will be close to 75.

Third quarter will end with September ingot production, approximating August output of 6,661,000 net tons, representing 63 per cent of the September capacity.

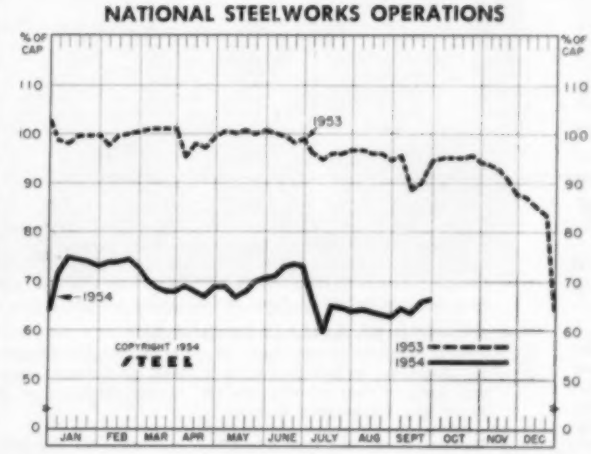
GOOD EVIDENCE— Evidence of the rise in demand for steel is seen at Pittsburgh Steel Co. It is receiving an increasing flow of orders for hot-rolled and cold-rolled carbon steel sheets and believes its fourth-quarter order books for those products will be filled. To help step up its steel output, the company is today restoring to operation one of its three blast furnaces at Monessen, Pa. Hot iron from this furnace will be used instead of equivalent amounts of cold scrap in charging open hearths so that steelmaking can be speeded.

NEW BUSINESS— Demand is coming from the Navy for sheared plates for ships it is to start building. But over-all demand for plates still is not strong enough to extend delivery promises.

Volume of fabricated structural tonnage on which cost estimates are being figured is heavy. Most of this work is for bridges and public works, including many school buildings.

PRICES STEADY— Pricewise, the steel market remains steady. STEEL's price composite on finished steel remains at $117.77 a net ton. Steelmaking scrap composite also is unchanged at $29.75 a gross ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Sept. 26	Change	Same Week 1953	Same Week 1952
Pittsburgh	65.5	— 0.5*	97.5	103
Chicago	68	— 1*	100	105.5
Mid-Atlantic	58	— 2	96	98
Youngstown	51.5	0	104	106
Wheeling	86.5	— 3.5	97.5	97.5
Cleveland	79.5	+ 3	100.5	108
Buffalo	61	+ 4.5	108.5	104.5
Birmingham	75	0	96.5	101
New England	49	— 1	85	85
Cincinnati	62	+ 10	78.5	95
St. Louis	69	+ 2.5	89	106.5
Detroit	70	+ 2*	102	106.5
Western	81	0	103	102
National Rate	66.5	+ 0.5	94.5	102.5

INGOT PRODUCTION‡

	Week Ended Sept. 26	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	98.9†	98.5	94.3	123.5
NET TONS (In thousands)	1,583†	1,583	1,515	2,144

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,540 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 33 Technical Outlook—p. 83

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Sept. 21 1954	Sept. 14 1954	Month Ago	Aug. Average
(1947-1949=100)	144.6	144.6	144.5	144.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 21

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525
Rails, light, 40 lb	5.917
Tie Plates	5.275
Axles, railway	7.500
Wheels, freight car, 33 in. (per wheel)	48.500
Plates, carbon	4.675
Structural Shapes	4.517
Bars, tool steel, carbon (lb)	0.430
Bars, tool steel, alloy, oil hardening die (lb)	0.525
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.115
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., alloy	8.783
Bars, H.R., stainless, 306 (lb)	0.418
Bars, H.R., carbon	5.023
Bars, reinforcing	5.058
Bars, C.F., carbon	8.174
Bars, C.F., alloy	11.285
Bars, C.F., stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.880
Sheets, C.R., carbon	5.871
Sheets, galvanized	7.220
Sheets, C.R., stainless, 302 (lb)	0.548
Sheets, electrical	9.350
Strip, C.R., carbon	$7.507
Strip, C.R., stainless, 430 (lb)	0.415
Strip, H.R., carbon	5.125
Pipe, black, buttweld (100 ft)	15.000
Pipe, galv., buttweld (100 ft)	18.605
Pipe, line (100 ft)	146.804
Casing, oil well, carbon (100 ft)	154.216
Casing, oil well, alloy (100 ft)	227.875
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.193
Tin, plate, hot-dipped, 1.25 lb	8.433
Tin plate, electrolytic, 0.25 lb	7.133
Black plate, can making quality	6.233
Wire, drawn, carbon	7.938
Wire, drawn, stainless, 430 (lb)	0.545
Bale ties (bundle)	5.860
Nails, wire, 8d common	7.815
Wire, barbed (80-rod spool)	7.109
Woven wire fence (20-rod roll)	16.815

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 22 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.19	194.19	194.19	189.38	152.52
Index in cents per lb.	5.261	5.261	5.261	5.130	4.132

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.77	$117.77	$117.77	$115.56	$91.55
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.10
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	29.75	29.75	29.00	36.50	27.08

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 22 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., del. Philadelphia	4.55	4.55	4.55	5.302	3.83
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95-4.00
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, del., Philadelphia	4.53	4.53	4.53	4.38	3.50
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.40
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.225	4.56	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.96	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.025	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45-5.95	4.00
Strip, C.R., Chicago	6.00	6.00	6.00	5.70	4.00-4.15
Strip, C.R., Detroit	5.60-.90	5.60-.90	5.60-.90	5.45-6.05	4.20-.25
Wire, Basic, Pitts.	5.75	5.75	5.75	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.675	4.675	4.675	4.525	3.40
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	49.66	49.66	49.66	60.75	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	50.16	50.16	50.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	60.43	45.43
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	200.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$30.50	$30.50	$29.50	$39.50	$29.75
No. 1 Heavy Melt, E. Pa.	28.75	28.75	27.50	34.50	25.00
No. 1 Heavy Melt, Chicago	30.00	30.00	30.00	35.50	26.50
No. 1 Heavy Melt, Valley	32.50	32.50	30.50	36.50	31.25
No. 1 Heavy Melt, Cleve.	30.50	28.50	28.50	32.50	26.50
No. 1 Heavy Melt, Buffalo	28.50	26.50	26.50	37.25	28.25
Rails, Rerolling, Chicago	47.50	44.50	44.50	51.00	41.50
No. 1 Cast, Chicago	35.50	35.50	35.50	35.00	41.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

Daily Nonferrous Price Record

	Price Sept. 22	Last Change	Previous Price	Aug. Avg.	July Avg.	Sept. 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.50
Lead	14.55	Sept. 15	14.30	13.846	13.800	13.540
Zinc	11.50	Sept. 3	11.00	11.000	11.000	10.180
Tin	93.75	Sept. 22	93.625	93.332	96.562	82.410
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	22.119	21.500	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+ %, del.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situation of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

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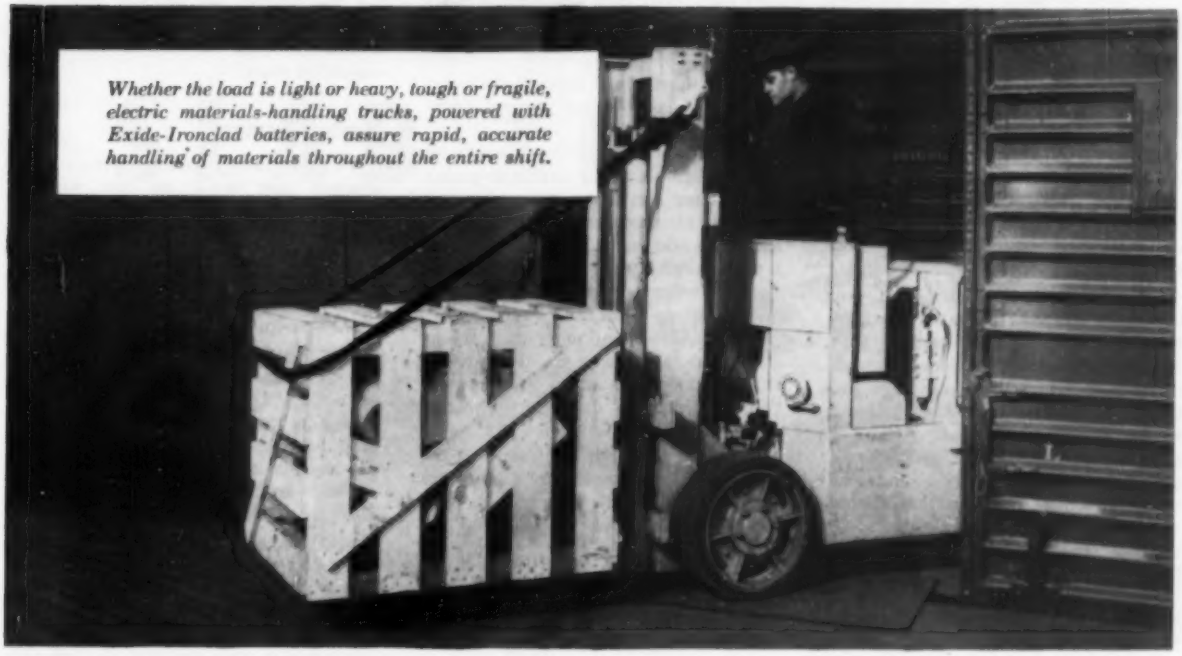

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Nonferrous Metals

Good fourth quarter appears cast for die casters. Year's use of zinc for die casting, however, will fall behind 1953, but aluminum consumption may match or exceed last year's

Nonferrous Metal Prices, Pages 126 & 127

DIE CASTERS are tooling up for heavy fourth-quarter production that may boost the industry to one of its best years.

To the fast-growing $400-million industry 1953 was a banner year, but the first half of 1954 proved disappointing.

Autos Take Less—Use of zinc and its alloys dropped 51 million pounds from the comparable period of 1953. As the auto industry consumes roughly half of all zinc die castings produced, the auto slump alone accounted for 21 million pounds of the consumption drop. Use in home appliances fell by 12 million pounds, national defense by 5 million pounds and all other categories tapered off in line with general industrial activity.

A fourth-quarter comeback still will find 1954 consumption of zinc for die castings about 20 to 22 per cent behind 1953. Aluminum consumption, however, may match or exceed last year's if third-quarter hopes meet fourth-quarter realization.

Better Off — Aluminum has made dramatic progress with die casters in recent years, but its use skidded by 7 million pounds in the first half. Industry men believe it would have registered a 7 to 8-million-pound gain if national defense had held steady.

Despite the over-all setback, automotive uses increased over 5 million pounds, industrial and commercial machinery and equipment increased 2 million pounds and slight gains were registered in office equipment and other categories. With a year-end spurt, last year's record isn't out of reach.

Magnesium, Too—Magnesium use in die castings reflected general business conditions. It was off in about the same proportions as aluminum, with the greatest drop in defense applications. Magnesium statistics (see table) aren't as comprehensive as those for zinc and aluminum. About 62 per cent of total zinc and 75 to 78 per cent of total aluminum die casting is performed by the jobbing industry, the rest by capitve shops.

Recent price rises in zinc and aluminum received close attention from the meeting of the American Die Casting Institute at Chicago in mid-month. Die casters are watching trends closely. They must make careful materials selection before planning production runs.

No Switch—Die casters operate on a piece rather than a cents-per-pound basis. They can't just convert a zinc machine to aluminum or vice versa. Ratio of aluminum to zinc is 2.4 to 1 on a volume basis, but zinc can be worked faster because of a 400-degree-lower melting point.

Die casters have reconciled themselves to the aluminum advance of this summer but admit the upward trend in zinc is disturbing. Special high-grade zinc sells for 13 cents today, die casting alloy for 15.50. A 1-cent-higher price, say die casters privately, will put them in trouble.

New Niche for Aluminum

Ceramic-coated aluminum is gaining a toehold in building and industry. Architectural porcelain enamel has caught the fancy of a number of architects and aircraft builders. They like the combination of light weight and protection against fire, corrosive gases, salt air and moisture. New production and application techniques are stirring interest in the combination's possibilities. One indication of this lies in a 10-year sales agreement between Halrick Co., Danbury, Conn., and Bettinger Corp., Waltham, Mass., for the former to produce and the latter to market the ceramic-coated aluminum with its line of porcelain enameled steel.

Market Memos

- Copper scrap buying prices tilted upward last week as the supply squeeze continues. No. 2 copper and wire scrap dealing at 26.25 indicates a market price of 30.50 to 31.00 cents in 90 days. Sales through dealers or to export markets of this high-priced refined metal is more likely than a higher price from mine producers.
- Government stockpilers are said to be willing to allow a 2-cent increase in zinc and lead before they stop buying. Insiders believe allowing the 2-cent rise is an integral part of the no-tariff-hike-but-stockpiling plan to relieve the ailing industries.
- Quick, accurate determination of hydrogen content in titanium and its alloys is said to be possible by new techniques developed by National Research Corp., Cambridge, Mass. Vacuum fusion gas analysis is said to get the answer in less than 20 minutes with accuracy within plus or minus 4 per cent.
- The Die Casting Research Foundation says it aims to extend use of the versatile forming process to higher melting point metals, such as copper, and, ultimately, ferrous metals.

Job Shop Output of Die Castings, First Half, 1954

	ZINC		ALUMINUM		MAGNESIUM*	
	Thousands of pounds	% of total zinc	Thousands of pounds	% of total aluminum	Thousands of pounds	% of total magnesium
Mining, Construction and Agricultural Machinery & Equipment	1,244	0.9	2,928	3.4	None	
Transportation—Motor Vehicle (except military)	71,742	51.9	27,819	32.3	490	32.5
Transportation—Miscellaneous (except military)	2,074	1.5	1,809	2.1	7	0.5
Industrial & Commercial Machines, Tools & Equipment	11,611	8.4	12,488	14.5	385	25.5
Communication Equipment & Electronic Devices	3,732	2.7	861	1.0	6	0.4
Office Equipment & Machines	3,732	2.7	3,790	4.4	165	10.9
Plumbing, Heating & Builders' Hardware	8,156	5.9	2,842	3.3	2	0.1
Instruments & Scientific Equipment	3,594	2.6	5,082	5.9	32	2.1
Timing Devices	1,659	1.2	947	1.1	None	
Home Appliances & Equipment	25,987	18.8	16,708	19.4	324	21.4
Sporting Goods, Jewelry, Personal Goods & Toys	1,659	1.2	1,120	1.3	2	0.1
National Defense	3,041	2.2	9,732	11.3	97	6.5
Totals	138,231		86,126		1,510	

* Magnesium data include reporting American Die Casting Institute members only.
Source: American Die Casting Institute.

every grade of ZINC

for urgent military and

civilian requirements

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Columbus, O. Chicago St. Louis New York

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 22.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 43, 5% Si, 23.8; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.5; No. 214, 3.8% Mg, 25.2; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.00 del. Midwest; Lake 30.00 del; Fire refined 29.75 del.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 14.55, chemical 14.65, corroding 14.65, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ81C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $305-$315, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 93.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max) $4.72; grade A-2 (0.5% Fe max) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston Alloy 20.75-21.25; No. 12 foundry alloy (No. 2 grade) 19.75-20.25; 5% silicon alloy, 0.60 Cu max., 23.25-23.50; 13 alloy, 0.60 Cu max., 23.25-23.50; 195 alloy 21.25-22.25; 108 alloy 20.25-20.75; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.00-21.50; grade 2, 20.00-20.50; grade 3, 19.00-19.50; grade 4, 18.00-18.50.

Brass Ingot: Red brass, No. 115, 28.50; tin bronze No. 225, 40.00; No. 245, 33.75; high-leaded tin bronze, No. 305, 33.00; No. 1 yellow, No. 405, 24.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $19.75 per cwt; pipe, full coils $19.75 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

	NICKEL, "A" Nickel	MONEL, Monel	INCONEL, Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	98.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks	...	60.0	...

ALUMINUM*

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	62.5	61.0	...	...
0.156-0.172	52.9	51.3	...	...
0.188	52.9	51.3	...	45.8
0.219-0.234	50.1	48.5	...	...
0.250-0.281	50.1	48.5	...	42.7
0.313	50.1	48.5	...	50.8
Cold-finished				
0.375-0.547	48.9	46.5	58.8	56.2
0.563-0.688	48.9	46.5	55.9	52.7
0.750-1.000	47.7	45.3	51.1	49.6
1.063	47.7	45.3	...	47.9
1.125-1.500	45.9	43.6	49.4	47.9
Rolled				
1.563	44.7	42.4	...	...
1.625-2.000	44.1	41.8	...	46.2
2.125-2.500	43.0	40.7	...	...
2.563-3.375	41.7	39.5	...	...

ALUMINUM*

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	34.9	...	...
0.135-0.096	12-48	35.4	...	...
0.095-0.077	12-48	36.1	33.6	33.6
0.076-0.061	12-48	36.7	33.8	33.8
0.060-0.048	12-48	37.2	34.1	39.2
0.047-0.038	12-48	37.7	34.6	39.6
0.037-0.030	12-48	38.1	35.0	40.3
0.029-0.024	12-48	38.7	35.3	40.8
0.023-0.019	12-36	39.4	36.1	41.6
0.018-0.017	12-36	40.2	36.7	42.5
0.016-0.015	12-36	41.1	37.5	43.7
0.014	12-24	42.1	38.5	45.0
0.013-0.012	12-24	43.3	39.2	46.0
0.011	12-24	44.3	40.4	47.6
0.010-0.0095	12-24	45.5	41.5	49.2
0.009-0.0085	12-24	46.8	43.0	51.3
0.008-0.0075	12-24	48.4	44.2	53.1
0.007	12-18	49.9	45.7	55.4
0.006	12-18	51.5	47.1	60.4

*72-180 in. lengths. †26 in. max. dia.

ALUMINUM*

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.7	38.9
5050-F	34.7	38.9
3004-F	35.7	40.6
6052-F	37.4	42.4
6061-T6	38.6	43.0
2024-T4*	40.8	46.9
7075-T6*	48.6	55.2

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM*

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-5 in.; rectangles and squares, Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
⅜	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

*Alloy designations are standard for use on and after Oct. 1, 1954. To relate them to designations used prior to that time, see STEEL, Aug. 9, 1954, p. 95.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ⅛ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 28 clippings 14.00; low copper clippings 14.00; mixed clippings 12.00; old sheet 11.00; borings and turnings 7.00; pistons and struts 8.50; crankcases 11.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Munts Metal	43.98	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.25; light copper 21.00-21.25; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.

Lead: Heavy 11.50-11.75; battery plate 6.25-6.50; linotype and stereotype 13.50-13.75; electrotype 11.75-12.00; mixed babbitt 12.50-12.75.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 5.00-5.25; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 28, 38 clippings 15.75-16.00; 518, 528 clippings 15.75-16.00; 148, 178, 248 clippings 15.00-15.25; mixed clipping 14.50-14.75; old sheet 13.75-14.00; old cast 13.75-14.00; clean old cable, free of steel 15.75-16.00; borings and turnings 14.00-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 27.25-27.75; No. 2 copper 26.00-26.25; light copper 24.50-24.75; refinery brass (60% copper) per dry copper content 24.50-25.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.00; No. 2 copper 25.25-25.50; light copper 23.75-24.00; No. 1 composition borings 20.50-21.00; No. 1 composition solids 21.50-22.00; heavy yellow brass solids 17.00-17.50; yellow brass turnings 16.00-16.50; radiators 18.00-18.25.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.115; 200-499 lb $1.10; 500-999 lb $1.095; 1000 lb or more $1.09.

Zinc: Bar 18.50, bar or flat top 17.50 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 71; 100-600 lb 58.7; 700-1900 lb 54.3; 2000-9900 lb 52.5; 10,000 lb or more 51.4.

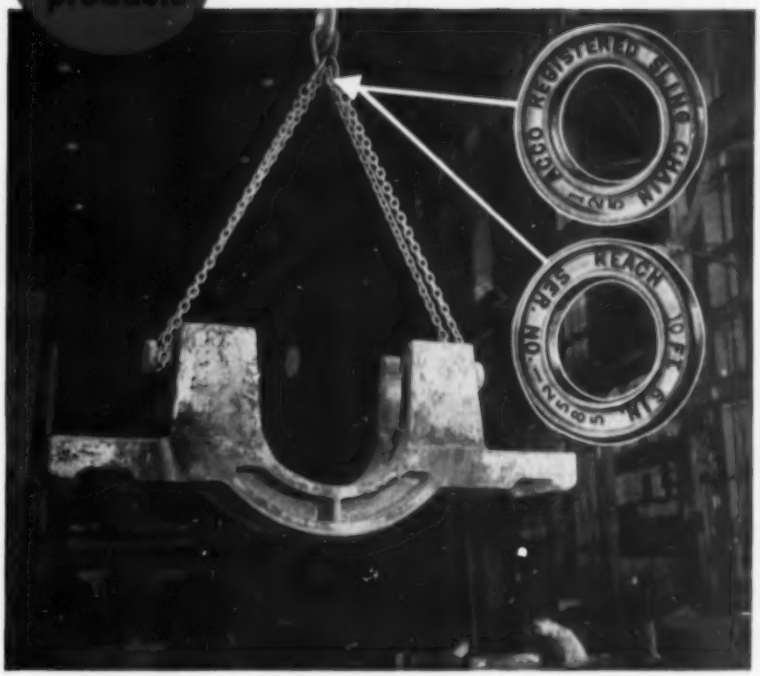
Stannous Chloride: (Anhydrous): Less than 50 lb $1.57; 50 lb $1.23; 100-300 lb $1.08; 400-900 lb $1.055; 100-1900 lb $1.031; 2000-4900 lb 99.4; 5000-19,000 lb 99.3; 20,000 lb and over 87.2.

Stannous Sulphate: Less than 5 lb $1.269; 50 lb 96.9; 100-1900 lb 94.9; 2000 lb and over 92.9.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

ACCO products

ACCO Registered* Sling Chains



What would it cost you if you dropped this casting?

• How many times a day do you gamble with a heavy load being lifted over expensive machines—or men? If you have ever dropped a load, you know the consequences. Time lost, damages—a general mess.

That's why you must be sure of the slings you use. That's why we suggest ACCO *Registered* Sling Chains with their inherent safety. For instance, a ⅜" double ACCO *Registered* Sling Chain used as a double-basket at a 60° angle has a working load limit of 11,400 pounds, almost six tons! Furthermore—it was proof-tested—overall—with a load equivalent to *twelve tons.*

With all this strength, ACCO *Registered* Sling Chains are light in weight . . . easy for your men to handle. That's because they're made of alloy chain which provides strength, great strength, with less weight.

There's much more to tell about these fine ACCO *Registered* Sling Chains. Call your ACCO *Registered* distributor today or write us for literature.

WHAT "ACCO REGISTERED" MEANS . . .

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling

*Trade Mark Registered

ACCO

American Chain Division

AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Rings Links Hooks

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on page 129. Key to footnotes, page 131.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$61.50

INGOTS, Alloy (NT)

Detroit R7	$65.00
Houston S5	73.00
Midland,Pa. C18	65.00
Munhall,Pa. U5	65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$64.00
Bessemer,Pa. U5	64.00
Buffalo R3	64.00
Clairton,Pa. U5	64.00
Ensley,Ala. T2	64.00
Fairfield,Ala. T2	64.00
Fontana,Calif. K1	72.00
Gary,Ind. U5	64.00
Johnstown,Pa. B2	64.00
Lackawanna,N.Y. B2	64.00
Munhall,Pa. U5	64.00
So.Chicago,Ill. R2,U5	64.00
So.Duquesne,Pa. U5	64.00
Youngstown R2	64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5	$78.00
Bessemer,Pa. U5	78.00
Buffalo R2	78.00
Canton,O. R2	80.00
Clairton,Pa. U5	78.00
Conshohocken,Pa. A3	83.00
Ensley,Ala. T2	78.00
Fairfield,Ala. T2	78.00
Fontana,Calif. K1	86.00
Gary,Ind. U5	78.00
Geneva,Utah C11	78.00
Houston S5	85.00
Johnstown,Pa. B2	78.00
Lackawanna,N.Y. B2	78.00
Los Angeles B3	87.50
Munhall,Pa. U5	78.00
Seattle B3	91.50
So.Chicago R2,U5,W14	78.00
So.Duquesne,Pa. U5	78.00
So.SanFrancisco B3	87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2	$86.00
Buffalo R2	86.00
Canton,O. R2, T7	86.00
Conshohocken,Pa. A3	93.00
Detroit R7	86.00
Fontana,Calif. K1	105.00
Gary,Ind. U5	86.00
Houston S5	93.00
Ind.Harbor,Ind. Y1	86.00
Johnstown,Pa. B2	86.00
Lackawanna,N.Y. B2	86.00
LosAngeles B3	106.00
Massillon,O. R2	86.00
Midland,Pa. C18	86.00
Munhall,Pa. U5	86.00
So.Chicago R2,U5,W14	86.00
So.Duquesne,Pa. U5	86.00
Struthers,O. Y1	86.00
Warren,O. C17	86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$98.50
Canton,O. R2	96.50
Cleveland R2	96.50
Gary,Ind. U5	96.50
So.Chicago R2, W14	96.50
So.Duquesne,Pa. U5	96.50

SKELP

Aliquippa,Pa. J5	4.00
Fontana,Calif. K1	4.775
Munhall,Pa. U5	3.90
Warren,O. R2	3.90
Youngstown R2, U5	3.90

WIRE RODS

AlabamaCity,Ala. R2	4.675
Aliquippa,Pa. J5	4.675
Alton,Ill. L1	4.85
Buffalo B11, W12	4.675
Cleveland A7	4.675
Donora,Pa. A7	4.675
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Houston S5	5.075
IndianaHarbor,Ind. Y1	4.675
Johnstown,Pa. B2	4.675
Joliet,Ill. A7	4.675
KansasCity,Mo. S5	5.016
Kokomo,Ind. C16	4.775
LosAngeles B3	5.475
Minnequa,Colo. C10	4.925
Monessen,Pa. P7	4.675
No.Tonawanda,N.Y. B11	4.675
Pittsburg,Calif. C11	5.325
Portsmouth P12	4.675
Roebling,N.J. R5	4.775
So.Chicago,Ill. R2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Struthers,O. Y1	4.675
SparrowsPoint,Md. B2	4.775
Torrance,Calif. C11	5.475
Worcester,Mass. A7	4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5	4.25
Bessemer,Ala T2	4.25
Bethlehem,Pa. B2	4.30
Birmingham C15	4.25
Clairton,Pa. U5	4.25
Fairfield,Ala. T2	4.25
Fontana,Calif. K1	4.90
Gadsden,Ala (31) R2	4.28
Gary,Ind. U5	4.25
Geneva,Utah C11	4.25
Houston S5	4.65
Ind.Harbor,Ind. I-2	4.25
Johnstown, Pa. B2	4.30
KansasCity,Mo. S5	4.85
Lackawanna,N.Y. B2	4.30
LosAngeles B3	4.95
Minnequa,Colo. C10	4.70
Munhall,Pa. U5	4.25
Niles,Calif. P1	4.80
Phoenixville,Pa. P4	3.95
Seattle B3	5.00
So.Chicago U5, W14	4.25
So.SanFrancisco B3	4.90
Torrance,Calif. C11	4.95
Weirton,W.Va. W6	4.25

Wide Flange

Bethlehem,Pa. B2	4.30
Clairton,Pa. U5	4.25
Fontana,Calif. K1	5.25
Lackawanna,N.Y. B2	4.30
Munhall,Pa. U5	4.25
Phoenixville,Pa. P4	3.95
So.Chicago,Ill. U5	4.25

Alloy Stand. Shapes

Clairton,Pa. U5	5.20
Fontana,Calif. K1	6.60
Gary,Ind. U5	5.20
Houston S5	5.60
Munhall,Pa. U5	5.20
So.Chicago,Ill. U5	5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5	6.40
Bessemer,Ala. T2	6.40
Bethlehem,Pa. B2	6.45
Clairton,Pa. U5	6.40
Fairfield,Ala. T2	6.40
FontanaCalif. K1	7.05
Gary,Ind. U5	6.40
Geneva,Utah, C11	6.40
Houston S5	6.80
Ind.Harbor,Ind. I-2, Y1	6.40
Johnstown,Pa. B2	6.45
KansasCity,Mo. S5	7.00
Lackawanna,N.Y. B2	6.45
LosAngeles B3	7.10
Munhall,Pa. U5	6.40
Seattle B3	7.15
So.Chicago,Ill. U5, W14	6.40
So.SanFrancisco B3	7.05
Struthers,O. Y1	6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	6.45
Lackawanna,N.Y. B2	6.45
Munhall,Pa. U5	6.40
So.Chicago,Ill. U5	6.40

PILING

BEARING PILES

Munhall,Pa. U5	4.25
So.Chicago,Ill. U5	4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.075
Lackawanna,N.Y. B2	5.075
Munhall,Pa. U5	5.075
So.Chicago,Ill U5	5.075

PLATES

PLATES, Carbon Steel

Aliquippa,Pa. J5	4.225
Ashland,Ky.(15) A10	4.225
Bessemer,Ala. T2	4.225
Buffalo(31) R2	4.255
Clairton,Pa. U5	4.225
Claymont,Del. C22	4.225
Cleveland J5	4.225
Cleveland(31) R2	4.285
Coatesville,Pa. L7	4.225
Conshohocken,Pa. A3	4.225
Ecorse,Mich. G5	4.375
Fairfield,Ala. T2	4.225
Gadsden,Ala.(31) R2	4.265
Fontana,Calif.(30) K1	4.875
Gary,Ind. U5	4.225
Geneva,Utah C11	4.225
GraniteCity,Ill. G4	4.425
Harrisburg,Pa. C5	3.975
Houston S5	4.625
Ind.Harbor,Ind. I-2, Y1	4.225
Johnstown,Pa. B2	4.225
Lackawanna,N.Y. B2	4.225
LoneStar,Tex. L6	*4.55*
Mansfield,O. E6	4.225
Minnequa,Colo. C10	5.075
Munhall,Pa. U5	4.225
Newport,Ky. N9	4.225
Pittsburgh J5	4.225
Riverdale,Ill. A1	4.225
Seattle B3	5.125
Sharon,Pa. S3	4.225
So.Chicago,Ill.(31) R2	4.295
So. Chicago,Ill U5,W14	4.225
SparrowsPoint,Md. B2	4.225
Steubenville,O. W10	4.225
Warren,O.(31) R2	4.265
Weirton,W.Va. W6	4.225
Youngstown(31) R2	4.275
Youngstown U5, Y1	4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1	6.025
Geneva,Utah C11	5.375

PLATES, Wrought Iron

Economy,Pa. B14	9.80

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5	6.45
Bessemer,Ala. T2	6.45
Clairton,Pa. U5	6.45
Cleveland J5, R2	6.45
Conshohocken,Pa. A3	6.45
Ecorse,Mich. G5	6.60
Fairfield,Ala. T2	6.45
Fontana,Calif.(30) K1	7.15
Gary,Ind. U5	6.45
Geneva,Utah C11	6.45
Houston S5	6.85
Ind.Harbor,Ind. I2, Y1	6.45
Johnstown,Pa. B2	6.45
Lackawanna,N.Y. B2	6.45
LosAngeles B3	7.35
Munhall,Pa. U5	6.45
Pittsburgh J5	6.45
Seattle B3	7.35
Sharon,Pa. S3	6.45
So.Chicago,Ill. U5, W14	6.45
SparrowsPoint,Md. B2	6.45
Youngstown U5, Y1	6.45

PLATES, Alloy

Claymont,Del. C22	5.80
Coatesville,Pa. L7	5.80
Fontana,Calif. K1	6.45
Gary,Ind. U5	5.80
Houston S5	6.20
Johnstown,Pa. B2	5.80
Munhall,Pa. U5	5.80
Newport,Ky. N9	5.80
Seattle B3	6.70
Sharon,Pa. S3	5.80
So.Chicago,Ill. U5, W14	5.80
SparrowsPoint,Md. B2	5.80

FLOOR PLATES

Cleveland J5	5.275
Conshohocken,Pa. A3	5.275
Harrisburg,Pa. C5	5.15
Ind.Harbor,Ind. I-2	5.275
Munhall,Pa. U5	5.275
So.Chicago,Ill. U5	5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10	4.475
Ashland l.c.l. (15) A10	4.975
Cleveland c.l. R2	4.825
Warren,O. c.l. R2	4.825

BARS

BARS, Hot-Rolled Carbon

Aliquippa,Pa. J5	4.30
Alton,Ill. L1	4.50
Atlanta,Ga. A11	4.50
Bessemer,Ala. T2	4.30
Birmingham C15	4.30
Buffalo(31) R2	4.33
Canton,O.(31) R2	4.46
Clairton,Pa. U5	4.30
Cleveland(31) R2	4.36
Ecorse,Mich. G5	4.45
Emeryville,Calif. J7	5.05
Fairfield,Ala. T2	4.30
Fairless,Pa. U5	4.45
Fontana,Calif.K1	5.00
Gary,Ind. U5	4.30
Gadsden,Ala.(31) R2	4.33
Houston S5	4.70
Ind.Harbor,Ind. I-2, Y1	4.30
Johnstown,Pa. B2	4.30
KansasCity,Mo. S5	4.90
Lackawanna,N.Y. B2	4.30
LosAngeles B3	5.00
Massillon,O.(31) R2	4.46
Milton,Pa. M18	4.30
Minnequa,Colo. C10	4.75
Niles,Calif. P1	4.85
N.Tonawanda,N.Y. B11	4.30
Pittsburg,Calif. C11	5.00
Pittsburgh J5	4.30
Portland,Oreg. O4	5.05
Seattle B3, N14, P23	5.05
So.Chicago(31) R2	4.37
So.Chicago U5, W14	4.30
So.Duquesne,Pa. U5	4.30
SoSanFran.,Calif. B3	5.05
Sterling,Ill.(1) N15	4.30
Sterling,Ill. N15	4.40
Struthers,O. Y1	4.30
Torrance,Calif. C11	5.00
Warren,O. (31) R2	4.34
Weirton,W.Va. W6	4.30
Youngstown U5	4.30
Youngstown(31) R2	4.35

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	5.075
Buffalo(31) R2	5.105
Canton,O. T7	5.075
Canton,O.(31) R2	5.115
Chicago(31) R2	5.145
Clairton,Pa. U5	5.075
Detroit R7	5.075
Ecorse,Mich. G5	5.225
Fontana,Calif. K1	6.125
Fairless,Pa. U5	5.225
Gary,Ind. U5	5.075
Houston S5	5.475
Ind.Harbor,Ind. I-2, Y1	5.075
Johnstown,Pa. B2	5.075
KansasCity,Mo. S5	5.675
Lackawanna,N.Y. B2	5.075
LosAngeles B3	6.125
Massillon,O.(31) R2	5.115
Midland,Pa. C18	5.075
So.Chicago U5, W14	5.075
So.Duquesne,Pa. U5	5.075
Struthers,O. Y1	5.075
Warren,O. C17	5.075
Youngstown U5	5.075

BARS & SMALL SHAPES, H.S. High-Strength Low-Alloy

Aliquippa, Pa. J5	6.45
Bessemer,Ala T2	6.45
Bethlehem,Pa. B2	6.45
Clairton,Pa. U5	6.45
Cleveland(31) R2	6.45
Ecorse,Mich. G5	6.60
Fairfield,Ala. T2	6.45
Fontana,Calif. K1	7.70
Gary,Ind. U5	6.45
Houston S5	6.85
Ind.Harb.,Ind. I-2, Y1	6.45
Johnstown,Pa. B2	6.45
KansasCity,Mo. S5	7.05
Lackawanna,N.Y. B2	6.45
LosAngeles B3	7.15
Pittsburgh J5	6.45
Seattle B3	7.20
So.Chicago W14	6.45
So.Duquesne,Pa. U5	6.45
So.SanFrancisco B3	7.20
Struthers,O. Y1	6.45
Warren,O.(31) R2	6.45
Youngstown U5	6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2	4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	4.30
Atlanta A11	4.50
Fontana,Calif. K1	5.00
Niles,Calif. P1	4.85
SanFrancisco S7	4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	5.20
Gary,Ind. U5	5.20
Houston S5	5.60
KansasCity S5	5.80
Youngstown U5	5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	5.40
BeaverFalls,Pa. M12	5.40
BeaverFalls,Pa.(31) R2	5.46
Camden,N.J. P13	5.85
Carnegie,Pa. C12	5.40
Chicago W18	5.40
Cleveland A7, C20	5.40
Detroit R7	5.40
Detroit B5, P17	5.60
Donora,Pa A7	5.40
Elyria,O. W8	5.40
FranklinPark,Ill. N5	5.40
Gary,Ind. (31) R2	5.47
GreenBay,Wis. F7	5.40
Hammond,Ind. L2, M13	5.40
Hartford,Conn.(31) R2	5.90
Harvey,Ill. B5	5.40
LosAngeles(31) R2	6.85
LosAngeles S30	6.85
Mansfield,Mass B5	5.95
Massillon,O. R8	5.40
Massillon,O.(31) R2	5.44
Monaca,Pa. S17	5.40
Newark,N.J. W18	5.85
NewCastle,Pa.(17) B4	5.40
Pittsburgh J5	5.40
Plymouth,Mich. P5	5.65
Putnam,Conn. W18	5.95
Readville,Mass. C14	5.95
St. Louis,Mo. M5	5.70
So.Chicago,Ill. W14	5.40
SpringCity,Pa. K3	5.85
Struthers,O. Y1	5.40
Waukegan,Ill. A7	5.40
Worcester,Mass. W19	5.85
Youngstown F3, Y1	5.40

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19	4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	6.625
BeaverFalls,Pa. M12	6.625
BeaverFalls,Pa. R2	6.685
Bethlehem,Pa. B2	6.625
Buffalo B5	6.625
Camden,N.J. P13	6.80
Canton,O. T7	6.625
Carnegie,Pa. C12	6.625
Chicago W18	6.625
Cleveland A7, C20	6.625
Detroit R7	6.625
Detroit B5, P17	6.825
Donora,Pa. A7	6.625
Elyria,O. W8	6.625
Gary,Ind.(31) R2	6.695
Hammond,Ind. L2, M13	6.625
Hartford,Conn.(31) R2	6.925
Harvey,Ill. B5	6.625
Lackawanna,N.Y. B2	6.625
LosAngeles S30	8.30
Mansfield,Mass. B5	6.925
Massillon,O. R8	6.625
Massillon,O.(31) R2	6.665
Midland,Pa. C18	6.625
Monaca,Pa. S17	6.625
Newark,N.J. W18	6.80
Plymouth,Mich. P5	6.825
So.Chicago W14	6.625
SpringCity,Pa. K3	6.80
Struthers,O. Y1	6.625
Warren,O. C17	6.625
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925
Youngstown F3, Y1	6.625

BARS, Reinforcing (fabricators)

Atlanta A11	4.50
Birmingham C15	4.30
Buffalo(31) R2	4.33
Cleveland(31) R2	4.36
Emeryville,Calif. J7	5.05
Fairfield,Ala. T2	4.30
Fairless,Pa. U5	4.45
Fontana,Calif. K1	5.00
Ft.Worth,Tex.(42) T6	4.90
Gadsden,Ala.(31) R2	4.33
Gary,Ind. U5	4.30
Houston S5	4.70

Ind. Harbor, Ind. I-2, Y1 4.30
Johnstown, Pa. B2 ..... 4.30
Kansas City, Mo. S5 .... 4.90
Lackawanna, N.Y. B2 ... 4.30
Los Angeles B3 ..... 5.00
Milton, Pa. M18 ..... 4.30
Minnequa, Colo. C10 .... 4.75
Niles, Calif. P1 ..... 4.85
Pittsburg, Calif. C11 .... 5.00
Pittsburgh J5 ..... 4.30
Sand Springs, Okla. S5 .. 5.15
Seattle B3, N14, P23 .. 5.05
So. Chicago (31) R2 .... 4.37
So. Duquesne, Pa. U5 ... 4.30
So. San Francisco B3 .... 5.05
Sparrows Point, Md. B2 .. 4.30
Sterling, Ill. (1) N15 .... 4.30
Sterling, Ill. N15 ..... 4.40
Struthers, O. Y1 ..... 4.30
Torrance, Calif. C11 .... 5.00
Youngstown U5 ..... 4.30
Youngstown (31) R2 .... 4.35

BARS, Reinforcing (Fabricated; to consumers)

Johnstown, ¼-1" B2 .. 5.70
Kansas City S5 ..... 6.50
Los Angeles B3 ..... 5.95
Marion, O. P11 ..... 5.55
Seattle B3, N14, P23 ... 6.15
So San Francisco B3 .... 6.00
Sparrows Pt. ¼-1" B2 .. 5.70
Williamsport, Pa. S19 .. 5.60

RAIL STEEL BARS

Avis, Pa. (3) J8 ..... 4.25
Chicago Hts. (3) C2, I-2 4.20
Chicago Hts. (4) C2, I-2 4.30
Ft. Worth, Tex. (26) T4 .. 4.75
Franklin, Pa. (3) F5 .... 4.05
Franklin, Pa. (4) F5 .... 4.15
Marion, O. (3) P11 ..... 4.15
Moline, Ill. (3) R2 ..... 4.30
Tonawanda (3,4) B12 ... 4.30
Williamsport, Pa. (3) S19 4.30

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 10.85
Economy, Pa. (D.R.) B14 13.50
Economy (Staybolt) B14 13.80
McK. Rks. (S.R.) L5 .. 10.85
McK. Rks. (D.R.) L5 .. 14.75
McK. Rks. (Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)

Allenport, Pa. P7 ..... 4.05
Ashland, Ky. (8) A10 .... 4.05
Cleveland J5, R2 ..... 4.05
Conshohocken, Pa. A3 .. 4.10
Detroit (8) M1 ..... 4.20
Ecorse, Mich. G5 ..... 4.20
Fairfield, Ala. T2 ..... 4.05
Fairless, Pa. U5 ..... 4.10
Fontana, Calif. K1 .... 4.825
Gadsden, Ala. R2 ..... 4.05
Gary, Ind. U5 ..... 4.05
Geneva, Utah C11 ..... 4.15
Granite City, Ill. G4 .... 4.25
Houston S5 ..... 4.45
Ind. Harbor, Ind. I-2, Y1 4.05
Irvin, Pa. U5 ..... 4.05
Kokomo, Ind. C16 ..... 4.15
Lackawanna, N.Y. B2 .. 4.05
Mansfield, O. E6 (37) ... 4.05
Mansfield, O. E6 (38) ... 4.50
Munhall, Pa. U5 ..... 4.05
Newport, Ky. N9 ..... 4.05
Niles, O. N12 ..... 4.05
Pittsburg, Calif. C11 .... 4.75
Pittsburgh J5 ..... 4.05
Portsmouth, O. P12 ..... 4.05
Riverdale, Ill. A1 ..... 4.05
Sharon, Pa. S3 ..... 4.05
So. Chicago, Ill. W14 .... 4.05
Sparrows Point, Md. B2 .. 4.05
Steubenville, O. W10 .... 4.05
Warren, O. R2 ..... 4.05
Weirton, W.Va. W6 .... 4.05
Youngstown U5, Y1 .... 4.05

SHEETS, H.R. (19 ga. lighter)

Gadsden, Ala. R2 ..... 5.25
Kokomo, Ind. C16 ..... 5.20
Niles, O. N12 ..... 4.95

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.10
Conshohocken, Pa. A3 .. 6.15
Ecorse, Mich. G5 ..... 6.25
Fairfield, Ala. T2 ..... 6.10
Fairless, Pa. U5 ..... 6.15
Fontana, Calif. K1 .... 6.875
Gary, Ind. U5 ..... 6.10
Ind. Harbor, Ind. I-2, Y1 6.10
Irvin, Pa. U5 ..... 6.10
Lackawanna (35) B2 .... 6.10
Munhall, Pa. U5 ..... 6.10
Pittsburgh J5 ..... 6.10
Sharon, Pa. S3 ..... 6.10
So. Chicago, Ill. U5 ..... 6.10
Sparrows Point (36) B2 .. 6.10
Warren, O. R2 ..... 6.10
Weirton, W.Va. W6 ..... 6.10
Youngstown U5, Y1 .... 6.10

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10 .... 4.30
Cleveland R2 ..... 4.65
Ind. Harbor, Ind. I-2 .... 4.30
Warren, O. R2 ..... 4.65

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport, Pa. P7 ..... 4.95
Cleveland J5, R2 ..... 4.95
Ecorse, Mich. G5 ..... 5.10
Fairfield, Ala. T2 ..... 4.95
Fairless, Pa. U5 ..... 5.00
Follansbee, W.Va. F4 ... 4.95
Fontana, Calif. K1 ..... 6.05
Gary, Ind. U5 ..... 4.95
Granite City, Ill. G4 ..... 5.15
Ind. Harbor, Ind. I-2, Y1 4.95
Irvin, Pa. U5 ..... 4.95
Lackawanna, N.Y. B2 .. 4.95
Middletown, O. A10 ..... 4.95
Pittsburg, Calif. C11 .... 5.90
Pittsburgh J5 ..... 4.95
Portsmouth, O. P12 ..... 4.95
Sparrows Point, Md. B2 .. 4.95
Steubenville, O. W10 .... 4.95
Warren, O. R2 ..... 4.95
Weirton, W.Va. W6 .... 4.95
Youngstown Y1 ..... 4.95

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.50
Ecorse, Mich. G5 ..... 7.65
Fairless, Pa. U5 ..... 7.55
Fontana, Calif. K1 ..... 8.55
Gary, Ind. U5 ..... 7.50
Indiana Harbor, Ind. Y1 .. 7.50
Irvin, Pa. U5 ..... 7.50
Lackawanna (37) B2 ... 7.50
Pittsburgh J5 ..... 7.50
Sparrows Point (38) B2 .. 7.50
Warren, O. R2 ..... 7.50
Weirton, W.Va. W6 .... 7.50
Youngstown Y1 ..... 7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 5.65
Middletown, O. A10 ..... 5.45
Warren, O. R2 ..... 5.55

SHEETS, Culvert (16 Ga.)	Cu Alloy	Cu Fe
Ashland, Ky. A10	6.50	....
Canton, O. R2	6.25	7.10
Fairfield T2	6.25	6.50
Gary, Ind. U5	6.25	6.50
Ind. Harbor I-2	6.25	6.50
Irvin, Pa. U5	6.25	6.50
Kokomo, Ind. C16	6.35	....
Martins Fry., O. W10	6.25	....
Newport, Ky. N9	6.25	6.50
Pitts., Calif. C11	7.00	....
Sparrows Pt. B2	6.25	....

SHEETS, Culvert Pure Iron

Ashland, Ky. A10 ..... 6.75
Fairfield, Ala. T2 ..... 6.50
Martins Ferry, O. W10 ... 6.50

SHEETS, Galvanized Steel Hot-dipped

Ashland, Ky. A10 ..... 5.45*
Butler, Pa. A10 ..... 5.45†
Canton, O. R2 ..... 5.45‡
Dover, O. R1 ..... 5.45‡
Fairfield, Ala. T2 ..... 5.45*
Gadsden, Ala. R2 ..... 5.45‡
Gary, Ind. U5 ..... 5.45*
Granite City, Ill. G4 ... 5.65‡
Ind. Harbor, Ind. I-2 ... 5.45†
Irvin, Pa. U5 ..... 5.45†
Kokomo, Ind. C16 ..... 5.55‡
Martins Ferry, O. W10 .. 5.45*
Middletown, O. A10 .... 5.45†
Newport, Ky. N9 ..... 5.45†
Niles, O. N12 ..... 5.45‡
Pittsburg, Calif. C11 .. 6.20‡
Sparrows Pt., Md. B2 .. 5.45‡
Steubenville, O. W10 ... 5.45‡
Weirton, W.Va. W6 .... 5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength Low-Alloy

Irvin, Pa. U5 ..... 8.20
Sparrows Point (39) B2 .. 8.20

SHEETS, Galvannealed Steel

Canton, O. R2 ..... 5.85
Irvin, Pa. U5 ..... 5.85
Kokomo, Ind. C16 ..... 5.95†
Newport, Ky. N9 ..... 6.00
Niles, O. N12 ..... 6.00

SHEETS, Galvanized Ingot Iron

Ashland, Ky. (8) A10 .... 5.70
Canton, O. R2 ..... 6.20

SHEETS, Galvanized Ingot Iron (Hot-dipped continuous)

Ashland, Ky. A10 ..... 5.70
Butler, Pa. A10 ..... 5.70
Middletown, O. A10 .... 5.70

SHEETS, Electrogalvanized

Cleveland (28) R2 ..... 6.30
Niles, O. (28) R2 ..... 6.30
Weirton, W.Va. W6 .... 5.975

SHEETS, Aluminum Coated

Butler, Pa. A10 ..... 8.625

SHEETS, Enameling Iron

Ashland, Ky. (8) A10 ... 5.375
Cleveland R2 ..... 5.375
Gary, Ind. U5 ..... 5.375
Granite City, Ill. G4 .... 5.575
Ind. Harbor, Ind. I-2 ... 5.375
Irvin, Pa. U5 ..... 5.375
Middletown, O. A10 .... 5.375
Niles, O. N12 ..... 5.375
Youngstown Y1 ..... 5.375

BLUED STOCK, 29 ga.

Follansbee, W.Va. F4 .. 7.375
Follansbee (23) F4 .... 6.60
Yorkville, O. W10 ..... 7.375

SHEETS, Long Terne Steel (Commercial Quality)

Beech Bottom, W.Va. W10 5.85
Gary, Ind. U5 ..... 5.85
Mansfield, O. E6 ..... 5.85
Middletown, O. A10 .... 5.85
Niles, O. N12 ..... 5.85
Weirton, W.Va. W6 .... 5.85

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 .... 6.25

SHEETS, Wall Casing

Fontana, Calif. K1 .... 6.325

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Div., H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S. & W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Follak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West. Auto. Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Allenport,Pa. P7 ....4.05
Alton,Ill. L1 ....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 ....4.25
Bessemer,Ala. T2 ....4.05
Birmingham C15 ....4.05
Bridgeport,Conn.(10)S15 4.05
Buffalo(27) R2 ....4.05
Conshohocken,Pa. A3 ..4.175
Detroit M1 ....4.20
Ecorse,Mich. G5 ....4.20
Fairfield,Ala. T2 ....4.05
Fontana,Calif. K1 ....4.825
Gadsden,Ala.(27) R2 ....4.05
Gary,Ind. U5 ....4.05
Houston,Tex. S5 ....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2 ..4.05
KansasCity,Mo.(9) S5 ..4.65
Lackw'na,N.Y.(25) B2..4.05
LosAngeles(25) B3 ....4.80
Milton,Pa. M18 ....4.05
Minnequa,Colo. C10 ....5.15
NewBritain(10) S15 ....4.05
N.Tonawanda,N.Y. B11.4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 ....4.05
Riverdale,Ill. A1 ....4.05
SanFrancisco S7 ....5.00
Seattle(25) B3, P23 ....5.05
Seattle N14 ....5.05
Sharon,Pa. S3 ....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2 ..4.05
Sterling(1) N15 ....4.05
Sterling,Ill. N15 ....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 ....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5 ....4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 ....6.70
Fontana,Calif. K1 ....8.10
Gary,Ind. U5 ....6.70
Houston,Tex. S5 ....7.10
KansasCity,Mo. S5 ....7.30
LosAngeles B3 ....7.90
NewBritn.,Conn.(10)S15 6.45
Newport,Ky. N9 ....6.70
Seattle P23 ....7.80
Sharon,Pa. S3 ....6.70
So.Chicago W14 ....6.70
Youngstown U5 ....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ....6.15
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 ....6.30
Fairfield,Ala. T2 ....6.15
Fontana,Calif. K1 ....7.25
Gary,Ind. U5 ....6.15
Houston S5 ....6.55
Ind.Harbor,Ind. I-2, Y1.6.15
KansasCity,Mo. S5 ....6.75
Lackawanna,N.Y. B2 ..6.15
LosAngeles(25) B3 ....6.90
Seattle(25) B3, P23 ....7.15
Sharon,Pa. S3 ....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 ....6.15
Weirton,W.Va. W6 ....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....4.30
Warren,O. R2 ....4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....5.75
Baltimore T6 ....5.75
Bridgeport,Conn.(10)S15 5.75
Cleveland A7, J5 ....5.75
Dearborn,Mich. D3 ....5.90
Detroit D2, M1 ....5.90
Detroit P20 ....5.95
Dover,O. G6 ....5.75
Ecorse,Mich. G5 ....5.90
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 ....7.65
FranklinPark,Ill T6 ....5.85
Ind.Harbor,Ind. I-2 ....6.00
Indianapolis C8 ....5.90
Lackawanna,N.Y. B2 ...5.75
LosAngeles C1 ....7.80
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
Pawtucket,R.I. R3 ....6.40
Pawtucket,R.I. N8 ....6.30
Pittsburgh J5 ....5.75
Portsmouth,O. P12 ....5.75
Riverdale,Ill. A1 ....5.85
Rome,N.Y.(32) R6 ....5.75
Sharon,Pa. S3 ....5.75
SparrowsPt. Md. B2 ...5.75
Trenton,N.J. R5 ....7.00
Wall'ford,Conn. W2 ....6.20
Warren,O. B9, R2, T5..5.75
Weirton,W.Va. W6 ....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18 ....12.45
Cleveland A7 ....12.45
Dover,O. G6 ....12.45
Fontana,Calif. K1 ....14.55
FranklinPark,Ill. T6 ..12.45
Harrison,N.J. C18 ....12.45
Mattapan,Mass. T6 ....12.80
Pawtucket,R.I. N8 ....12.80
Sharon,Pa. S3 ....12.45
Worcester,Mass. A7 ...12.75
Youngstown C8 ....12.90

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.30	11.15	13.85
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.90	8.25	9.20	....	....
Detroit D2	5.90	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan,Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill.(1) A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	10.95	13.25
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7	6.60	8.35	9.30	11.45	14.15
Worcester,Mass. T6	6.30	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 ....8.60
Dearborn,Mich. D3 ....8.75
Dover,O. G6 ....8.60
Ecorse,Mich. G5 ....8.75
Lackawanna,N.Y. B2 ..8.425
Pittsburgh J5 ....8.60
Sharon,Pa. S3 ....8.60
SparrowsPoint,Md. B2..8.425
Warren,O. R2 ....8.60
Weirton,W.Va. W6 ....8.60
Youngstown Y1 ....8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 ....6.35

STRIP, Electrogalvanized

Dover,O. G6 ....5.75
Youngstown C8 ....5.75

TIGHT COOPERAGE HOOP

Atlanta A11 ....4.775
Riverdale,Ill. A1 ....4.625
Sharon,Pa. S3 ....4.475
Youngstown U5 ....4.475

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric Motor B2	Electric Motor mo	Dynamo
BeechBottom,W.Va. W10	...	...	9.10	10.10	11.00
Brackenridge,Pa. A4	...	...	9.10	10.10	11.00
IndianaHarbor,Ind. I-2	8.025	8.50	9.10	10.10	....
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	...	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	...	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric Motor B2	Electric Motor mo	Dynamo
Brackenridge,Pa. A4	...	...	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*8.95*		9.55*10.55*		....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	...	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*8.75*		9.35*10.35*		11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	...	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. § Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va.W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 ....$6.50
Fairfield,Ala. T2 ....6.60
Fairless,Pa. U5 ....6.60
Gary,Ind. U5 ....6.50
GraniteCity,Ill. G4 ....6.70
Ind.Harbor,Ind. I-2, Y1.6.50
Irvin,Pa. U5 ....6.50
Niles,O. R2 ....6.50
Pittsburg,Calif. C11 ....7.25
Warren,O. R2 ....6.50
SparrowsPoint,Md. B2 ..6.60
Weirton,W.Va. W6 ....6.50
Yorkville,O. W10 ....6.50

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4 ...6.10
Gary,Ind. U5 ....6.10
GraniteCity,Ill. G4 ....6.30
Ind.Harbor,Ind. Y1 ....6.10
Irvin,Pa. U5 ....6.10
Yorkville,O. W10 ....6.10

MANUFACTURING TERNES (Special Coated)

Gary,Ind. U5 ....7.75
Irvin,Pa. U5 ....7.75
Yorkville,O. W10 ....7.75

MANUFACTURING TERNES (Light coated, 6 lb)

Yorkville,O. W10 ....8.65

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5 ....9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..5.75
Aliquippa,Pa. J5 ....5.75
Alton,Ill. L1 ....5.925
Atlanta A11 ....5.95
Bartonville,Ill. K4 ....5.85
Buffalo W12 ....5.75
Chicago W13 ....5.75
Cleveland A7, C20 ....5.75
Crawfordsville,Ind. M8..5.85
Donora,Pa. A7 ....5.75
Duluth,Minn. A7 ....5.75
Fairfield,Ala. T2 ....5.75
Fostoria,O.(24) S1 ....5.95
Houston S5 ....6.15
Jacksonville,Fla. M8 ...6.27
Joliet,Ill. A7 ....5.75
KansasCity, Mo. S5 ....6.35
Kokomo,Ind. C16 ....5.85
LosAngeles B3 ....6.70
Minnequa,Colo. C10 ....6.00
Monessen,Pa. P7 ....5.75
Newark 6-8 ga. I-1 ...6.40
No.Tonawanda B11 ....5.75
Palmer,Mass. W12 ....6.05
Pittsburg,Calif. C11 ....6.70
Portsmouth,O. P12 ....5.75
Rankin,Pa. A7 ....5.75
So.Chicago,Ill. R2 ....5.75
So.SanFrancisco C10 ...6.70
SparrowsPoint,Md. B2..5.85
Sterling,Ill.(1) N15 ....5.75
Sterling,Ill. N15 ....5.85
Struthers,O. Y1 ....5.75
Waukegan,Ill. A7 ....5.75
Worcester,Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 ....7.20
Alton,Ill. L1 ....7.375
Bartonville,Ill. K4 ....7.30
Buffalo W12 ....7.20
Cleveland A7 ....7.20
Donora,Pa. A7 ....7.20
Duluth,Minn. A7 ....7.20
Fostoria,O. S1 ....7.20
Johnstown,Pa. B2 ....7.20
LosAngeles B3 ....8.15
Millbury,Mass.(12) N8..7.50
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16...7.20
Muncie,Ind. I-7 ....7.40
Palmer,Mass. W12 ....7.50
Pittsburg,Calif. C11 ...8.15
Portsmouth,O. P12 ....7.20
Roebling,N.J. R5 ....7.50
So.SanFran. C10 ....8.15
SparrowsPt., Md. B2 ...7.30
Struthers,O. Y1 ....7.20
Trenton,N.J. A7 ....7.50
Waukegan,Ill. A7 ....7.20
Worcester A7,J4,T6,W12 7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5 ....6.90
Alton,Ill. L1 ....7.075
Buffalo W12 ....6.90
Cleveland A7 ....6.90
Donora,Pa. A7 ....6.90
Duluth,Minn. A7 ....6.90
Johnstown,Pa. B2 ....6.90
KansasCity,Mo. S5 ....7.50
LosAngeles B3 ....7.85
Minnequa,Colo. C10 ...7.075
Monessen,Pa. P7, P16 ..6.90
NewHaven,Conn. A7 ...7.20
Palmer,Mass. W12 ....7.20
Pittsburg,Calif. C11 ...7.85
Portsmouth,O. P12 ....6.90
Roebling,N.J. R5 ....7.20
So.Chicago,Ill. R2 ....6.90
So.SanFrancisco C10 ...7.85
SparrowsPoint,Md. B2 ..7.00
Trenton,N.J. A7 ....7.20
Waukegan,Ill. A7 ....6.90
Worcester,Mass. A7 ....7.20

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 ....11.375
Bartonville,Ill. K4 ....11.30
Buffalo W12 ....11.20
Chicago W13 ....11.20
Cleveland A7 ....11.20
Crawfordsville,Ind. M8..11.30
Fostoria,O. S1 ....11.20
Jacksonville,Fla. M8 ..11.73
Johnstown,Pa. B2 ....11.20
Kokomo,Ind. C16 ....11.20
Minnequa,Colo. C10 ..10.95
Monessen,Pa. P16 ....11.20
Muncie,Ind. I-7 ....11.40
Palmer,Mass. W12 ....11.50
Roebling,N.J. R5 ....11.50
So.SanFrancisco C10 ..11.55
Waukegan,Ill. A7 ....11.20
Worcester,Mass. A7,T6..11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 ....9.90
Buffalo W12 ....9.90
Johnstown,Pa. B2 ....9.90
Minnequa,Colo. C10 ..10.025
Monessen,Pa. P16 ....9.90
Muncie,Ind. I-7 ....10.10
Portsmouth,O. P2 ....9.90
Roebling,N.J. R5 ....10.20
SparrowsPt.,Md. B2 ..10.00

ROPE WIRE (A)

Alton,Ill. L1 ....9.45
Bartonville,Ill. K4 ....9.35
Buffalo W12 ....9.75
Fostoria,O. S1 ....9.75
Johnstown,Pa. B2 ....9.75
Monessen,Pa. P7 ....9.35
Monessen,Pa. P16 ....9.75
Muncie,Ind. I-7 ....9.95
Palmer,Mass. W12 ...10.05
Portsmouth,O. P12 ....9.35
Roebling,N.J. R5 ....10.05
SparrowsPt. B2 ....9.85
Struthers,O. Y1 ....9.75
Worcester J4, T6 ....6.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton,Ill. L1	12.75
Bartonville,Ill. K4	13.25
Monessen, Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

Wire, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind M8	8.95
Dover,O. G6	7.95
Fostoria,O. S1	7.95
Kokomo,Ind. C16	8.05
FranklinPark,Ill. T6	8.05
Massillon,O. R5	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtkt.,R.I. N8	8.25
Rome,N.Y (32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

Wire, Merchant Quality

(6 to 8 gage)	An'ld. Galv.
Ala.City,Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425‡
Atlanta A11	7.00 7.55
Bartonville(48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90 ....
Crawfordsville M8	7.00 7.55
Donora,Pa. A7	6.90 7.30†
Duluth,Minn. A7	6.90 7.30†
Fairfield T2	6.90 730†
Houston,Tex. S5	7.30 7.70†
Jacks'ville,Fla.M8	7.425 7.95
JohnstownB2(48)	6.90 7.45*
Joliet,Ill. A7	6.90 7.30†
KansasCity,Mo. S5	7.50 7.90†
Kokomo C16	7.00 7.40†
LosAngeles B3	7.85 ....
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts.,Calif. C11	7.85 8.25†
Portsmouth,O. P12	6.90 ....
Rankin A7	6.90 7.30†
So.Chi'go R2	6.90 7.30**
S.S.Frn. C10	7.85 8.25**
Spar'wsPt.B2(48).	7.00 7.55*
Str'g(1)(48)N15.	6.90 7.45
Struthers,O.(48)Y1	6.90 7.40‡
Worcester A7	7.20 ....

* Based on 11c zinc; † 5c zinc; ‡ Less than 10c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga. Col.

Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga.J5	149‡
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	154†
Johnstown,Pa. (43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	158†
Kokomo,Ind. C16	148†
Minnequa,Colo C10	154**
Monessen,Pa. 9 ga. P17	151
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

† Based on 5c zinc; *11c zinc; ‡ 10c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	163
KansasCity,Mo. S5	167
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed

	Col.
Alabama,City,Ala. R2	159**
Aliquippa J5	156‡
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	156†
Duluth,Minn. A7	156†
Fairfield,Ala. T2	156†
Houston,Tex. S5	167†
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	171†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	165**
Monessen,Pa. P7	163
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

† Based on 5c zinc; * 11c zinc; ‡ 10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)	An'ld Galv. Stone
Ala.City R2	13.15 14.70**
Aliquippa J5	12.50 14.30‡
Bartonville K4	13.25 15.10
Buffalo W12	13.15 ....
Cleveland A7	13.15 ....
CrawfordsvilleM8	13.25 15.10
Fostoria,O. S1	13.25 14.80†
Johnstown B2	13.15 15.00*
Kokomo C16	12.60 14.15†
Minnequa C10	13.40 15.10**
Palmer,Mas.W12	13.15 14.70*
Pitts.,Calif. C11	13.50 15.05†
So.Chicago R2	13.15 14.70
SparrowsPt. B2	13.25 15.10*
Sterling(1) N15	13.15 15.00
Waukegan A7	13.15 14.70†
Worcester A7	13.45 ....

* Based on 11c zinc; † 5c zinc; ‡ 10c zinc; ** Subject to zinc equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	145
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	149
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)

To dealers (33)	Col.
Conshohocken,Pa. A3	$3.30
Wheeling,W.Va. W10	3.30

STAPLES, Polished Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	138
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	140
Crawfordsville,Ind. M8	140
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	140
Minnequa,Colo. C10	143
Monessen,Pa. P7	138
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
So.Chicago,Ill. R2	138
SparrowsPt.Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2.	150
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	155
Moline,Ill. R2	155
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in. & ¾-in.	5
⅞-in. and larger	3
Longer than 6 in.:	
All diameters	+4
Lag bolts, all diams.:	
6 in. and shorter	12
Over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoes	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	58
H.P., Hex, regular & heavy:	
⅝" and smaller	58
¾" to 1⅛", inclusive.	60
1⅛" to 1½", inclusive	62
1⅝" and larger	58
C.P. Hex regular & heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
⅝" to 1½", inclusive.	40
⅞" to 1½", inclusive.	43
Finished Hex Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5—10
Plated finishes	30—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.52	33.59
2½	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. No. 2 All	Std. Toe Rails 60 lb Under
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	....	5.35
Fairfield,Ala. T2	....	....	....	5.35
Gary,Ind. U5	4.45	4.35	4.40	....
Huntington,W.Va. W7	....	....	....	5.35
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	....
Johnstown,Pa. B2	....	....	...(16)	5.35
Lackawanna,N.Y. B2	4.45	4.35	....	5.35
Minnequa,Colo. C10	4.45	4.35	....	5.35
Steelton,Pa. B2	4.45	4.35	....	5.35
Williamsport,Pa. S19	....	....	....	5.35

TIE PLATES	
Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (30) Treated	
Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh O3	11.50
Pittsburgh P14	11.50
Seattle,Wash. B3	12.00

AXLES	
Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS	
Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2, Y1	5.425
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

SCREW SPIKES	
Cleveland R2	11.00

STANDARD TRACK SPIKES	
Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	*15.25*
Unannealed	
Minus 100 mesh	*11.75*
Minus 35 mesh	*9.25*
Minus 20 mesh	*9.00*
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	*9.50*
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-143.00
Aluminum:	
Atomized, 500 lb drums, frgt. allowed:	
Carlots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots	29.75-37.75†
Bronze, ¼-ton lots	31.00-39.00†
Copper:	
Electrolytic	*13.75**
Reduced	*13.75**
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	89.50
Nickel-Silver, ¼-ton lots	44.25‡
Nickel-Silver, ¼-ton lots	47.00**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, ¼-ton lots	17.25-31.00‡

Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium electrolytic 99.2% Cr min.	2.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 26" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 0.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter, 48" and narrower.
(39) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(40) 9.10c for cut lengths.
(41) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(42) 9-14½ gage.
(43) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		78.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	13.5	list	17.5	0.25	20	2.75	21.5	4.25	21.5	4.25	20.75	3.5	23.25	6
Ambridge, Pa. N2 (††)	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3 (*)	13.5	2.25	17.5	3.25	20	5.75	21.5	7.25	21.5	7.25	20.75	6.5	23.25	9
Youngstown Y1 (††)	13.5	+1.5	17.5	0.75	20	3.25	21.5	4.75	21.5	4.75	20.75	4	23.25	6.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	....	....	....	....	23.75	7.5	26.75	11.5	29.25	15	31.75	16
Alton, Ill. L1 (‡)	...	...	....	....	....	....	21.75	6.5	24.75	10.5	27.25	14	29.75	14.75
Benwood, W. Va. W10(††)	24	+2.5	15.25	+8.25	7.25	+14.25	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Butler, Pa. F6‡‡	25	+1.5	17	+6.5	9.5	+12	....	..	....	...	....	...	....	....
Etna, Pa. N2 (†)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Fairless, Pa. N3	...	...	....	....	....	....	19.25	..	22.25	...	24.75	..	27.25	....
Fontana, Calif. K1 (**)	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor Y1 (††)	...	...	....	....	....	....	22.75	7.5	25.75	11.5	28.25	15	30.75	15.75
Lorain, O. N3 (*)	...	...	....	....	....	....	23.75	13.5	26.75	17.5	29.25	21	31.75	20.5
Sharon, Pa. S4 (‡)	25	+1.5	17	+6.5	9.5	+12	....	..	....	...	....	...	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2 (‡)	23	+3.5	15	+8.5	7.5	+14	31.75	6.5	24.75	10.5	27.25	13	29.75	14
Youngstown R2 (**)	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Youngstown Y1 (††)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Wheatland, Pa. W9 (‡)	23	+3.5	15	+8.5	7.5	+14	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	32.25	17	32.75	17.5	34.25	17.5	34.25	17.5	....	....	....	....
Alton, Ill. L1 (‡)	30.25	15.75	30.75	16.25	32.25	16	32.25	16	23.25	6.75	23.25	6.75
Benwood, W. Va. W10(††)	32.25	17.75	32.75	18.25	34.25	18	34.25	18	25.5	8.75	25.5	8.75
Etna, Pa. N2 (†)	32.25	17.75	32.75	18.25	34.25	19	34.25	19	25.5	8.75	25.5	8.75
Fairless, Pa. N3	27.75	....	28.25	....	29.75	...	29.75	...	21	...	21	...
Fontana, Calif. K1 (**)	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1 (††)	31.25	16.75	31.75	17.25	33.25	17	33.25	17	....	....	....	....
Lorain, O. N3 (*)	32.25	21.5	32.75	22	34.25	20.5	34.25	20.5	....	....	....	....
Sharon, Pa. M6	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	....	....	....
Sparrows Pt., Md. B2 (‡)	30.25	16	29.75	15.5	32.25	15.5	32.25	15.5	23.5	6.25	23.5	6.25
Youngstown R2 (**)	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Youngstown Y1 (††)	32.25	17.75	32.75	18.25	34.25	18	34.25	18	....	....	....	....
Wheatland, Pa. W9 (‡)	32.25	17.75	32.75	18.25	34.25	18	34.25	18	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), over 9c to 11c inclusive; (††), 10.50c-11.50c; (**), 11c-13c; (‡‡), 11c; with discounts adjusted on price of zinc at time or shipment.

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.60	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.75	38.25	50.25	39.50	40.75	50.75	59.75
501	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co., Johnson Steel & Wire Co, Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Cladding Stainless	Plates, Carbon Base, 10%	Plates, Carbon Base, 20%	Sheets, Carbon Base, 20%	Sheets, Copper Base, Both Sides
302	....	31.00	31.00	77.00
304	27.60-28.10	32.50-33.20	32.50	77.00
310	36.50	41.00	....	144.00
316	32.60-33.10	37.70-42.75	42.75	....
318	37.00-37.50	42.20-42.70	....	....
321	29.36-29.80	34.40-37.00	37.00	111.00
347	30.40-30.90	35.50-40.50	40.50	130.00
405	23.40-23.90	30.60-31.10	....	....
410	22.90-23.40	30.10-30.60	....	....
430	23.40	30.60	....	....
Inconel	46.90	61.90	....	165.00
Nickel	38.30	51.70	....	....
Monel	39.70	52.66	....	....
Copper*	....	....	46.00	....

	Strip, Carbon Base, Cold-Rolled, 10%	Strip, Carbon Base, Cold-Rolled, Both Sides	Strip, Carbon Base, Hot-Rolled, 10%	Strip, Carbon Base, Hot-Rolled, Both Sides
Copper*	28.85	35.85	25.00	32.25

* Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L2, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	52.38	52.88	....	....
Birmingham U5	....	52.88	56.50†	....
Gadsden, Ala. R2	52.38	52.88	....	....
Woodward, Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda, N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y. T9	....	56.50	57.00	57.50
Boston, del.	66.65	67.15	67.65	....
Rochester, N.Y., del.	59.02	59.52	60.02	....
Syracuse, N.Y., del.	60.13	60.63	61.13	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary, Ind. U5	56.00	....	56.50	....
Indiana Harbor, Ind. I-2	56.00	....	56.50	....
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon, Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron, O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	56.00	56.50	59.00	59.50
New York, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	56.00	56.50	....	....
Chester, Pa. C31	48.00	48.50	49.00	....
Philadelphia, del.	49.66	50.16	50.66	....
Steelton, Pa. B2	56.00	56.50	59.00	59.50
Swedeland, Pa. A3	56.00	56.50	59.00	59.50
Troy, N.Y. R3	56.00	56.50	59.00	....
Pittsburgh District				
Neville Island, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKees Rocks, del.	57.04	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, del.	57.66	58.16	58.16	58.66
Verona, Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....
Monessen, Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard, O. Y1	....	....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. B1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
Granite City, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
Lone Star, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T2	....	52.50*	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12¼ lb pigiets, 16% Si, frgt allowed K2	88.00
Wenatchee, Wash. OH & Fdry, freight allowed K2	85.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, del.	67.55
Troy, N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; New York and Boston, 10 cents; Buffalo, 25 cents on C.R. sheets, galv. sheets, C.F. and alloy bars and 20 cents on other commodities; Philadelphia, 10 cents, except 25 cents on alloy bars; Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††‡		Carbon	Floor
Baltimore	6.22	7.51	7.77	....	6.89	...	6.88	8.52¶	12.04	6.92	6.57	7.96**
Birmingham	6.35	7.35	8.25‡	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	44.78¶	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Carnegie, Pa.	6.38	...	8.30	....	6.72	...	6.51	7.85	12.15	6.72	6.65	6.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	45.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.25	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.89	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45¶	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.35	7.35	8.75
Los Angeles	7.40	9.25	9.80	50.15	7.75	11.75	7.35	10.05	13.20	7.55	7.35	9.45
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	6.81	6.87	...
New York	6.97	7.91	8.79	44.45	7.56	...	7.37	8.73¶	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.23	41.98¶	6.96	8.80	6.74	8.36¶	12.11	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	45.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64
Portland, Oreg.	7.60	8.75	9.70	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.30	8.67	....	6.77	....	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.03	8.03	8.96	....	7.28	...	7.16	8.26	....	7.12	7.19	8.30
San Francisco	7.55	8.95	9.35	48.15	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.50	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65¶	10.05	....	7.80	...	7.80	10.85¶	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 5000 lb except in New York and Boston where base is 10,000 lb. ¶—500 to 9999 lb; ¶—4000 lb and over; ¶—1000 to 1999 lbs; ¶—1000 lb and over; ¶—1500 lb to 3999; ¶—under ½ in.; ¶—f.o.b. local delivery in lots of 10,000 lb and over.

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Tin Plate Production Thrives on Canned Diet Of Growing Population

Greater consumption of canned soft drinks may help break 1954 output record. Electrolytic plate gains

A COMPLETE LUNCH from "tin cans" was served at Jones & Laughlin Steel Corp.'s annual stockholders' meeting this year.

The food, from fruit juice to nuts, symbolized the growing need for containers in food distribution. J&L and other tin plate producers think the trend will continue.

Canned Existence—Statistics of the National Canners Association, Washington, show that consumption of canned products is growing rapidly. Between 1945 and 1951, each of us ate about a third more canned fruit; each of us eats about 40 per cent more canned vegetables than we did in 1939. Our juice consumption in 1951 was five times the 1935-1939 average, and our thirst still isn't satisfied.

The range of foods being canned overcomes partially the old menace of seasonal fluctuations in sales of tin plate to canmakers. "There's no doubt that the long term trend is to less-seasonal shipments," a midwestern sales manager reports.

Impact on Tin Plate—American Iron & Steel Institute statistics show 1953 production of tin plate, including short ternes, reached 4,661,538 tons. Last year saw a new record, slightly above 1950 total of 4,640,296 tons, but well above the 1952 mark of 4,109,341 tons. This year began at record pace, and it should end close to last year in total shipments.

A strike threat this year upset scheduling of tin plate orders, resulting in higher-than-normal first half shipments. Some 2.3 million tons of electrolytic tin plate were shipped the first six months, compared with 3.3 million tons in all of 1953. Producers shipped an estimated 700,000 tons of tin plate to canmakers in June before the United Steelworkers' contract deadline. July sales suffered as a result, but they're gaining and should remain on a firm plateau below June level in fourth quarter.

Trend—Tin plate (black plate processed by pickling and coated with commercially pure tin) can be produced by hot dipping or electrodeposition. A trend favors the latter. Output of electrolytic tin plate jumped from 896,323 tons in 1946 to 3,343,458 tons in 1953, AISI reports. It made up 6.8 per cent of all mill shipments of finished steel in the first half of 1954, compared with 4.4 per cent in the same period last year.

Capacity for hot-dipped tin and terne plate slipped from 3.2 million tons in 1951 to 2.7 million tons in 1954. Electrolytic capacity blossomed from 3.3 million tons to 4.5 million tons.

Two Sides Different—The electrolytic product gains strength from growing sales of differentially coated tin plate. Different current densities put four times more tin on one side than on the other. Such developments prompt a Pennsylvania sales manager to predict hot-dipped capacity will be negligible in five years.

Producers say the differentially coated product is cheaper because tin is used more economically. "It's used mainly for food packing now," say salesmen at U. S. Steel Corp. "The tin plate replaces metal with even thicknesses of tin. Applications should grow rapidly." It's estimated that 5 per cent of electrolytic capacity is at work on the new product, which can be made on regular lines. From that point, the differential plate goes into cans that need heavy coatings inside but not outside, say to protect against acid in a food.

Light Refreshment — Soft-drink cans account for much of the improvement in sales this year and last. Early this year, producers saw about 60,000 tons of tin plate going to this market in 1954. Now shipments are expected to be closer to 100,000 tons.

Commenting on the tin can trend, Weirton Steel Co., Weirton, W. Va., says: "At the end of 1953, five 'bottlers' used cans to market soft drinks, with estimated can consumption for 1953 set at 130 million. In mid-1954, at least 36 plants were canning soft drinks with can consumption expected to top the 1 billion mark this year."

For Automakers — Heavy-gage electrolytic tin-coated sheet also has far-reaching applications. It's used in automobiles and appliances where corrosion resistance is a factor.

Basic strength of tin plate sales was evident when tin mills boosted prices, effective Oct. 1, 1954, at a time when sales generally drop.

Outlook—Tin plate producers are optimistic about long-term prospects. As Weirton points out, although 1

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billion "tin cans" are now used annually to can soft drinks, Americans consume 36 billion containers of soft drinks every year. That's the kind of big game industry likes to hunt.

Sheet Extras Revised

U. S. Steel Corp. effects changes in cards Sept. 18. The narrow widths are largely involved

Sheet & Strip Prices, Pages 129 & 130

Revised extra cards on several sheet and strip classifications hold the attention of consumers.

Last week U. S. Steel Corp. issued revised lists, dated Sept. 18, on hot-rolled sheets, hot-rolled strip, galvanized sheet products, vitrenamel sheets, and long terne sheets. Other producers are expected to take similar action. U. S. followed the lead of several others in issuing new cards on cold-rolled sheets.

In general, the changes in extras are minor, chiefly applying to packaging charges.

U. S. Steel's revised card on cold-rolled sheets replaces a list in effect since May 14, 1953. Changes are similar to those announced by several other producers recently, reported in STEEL, Sept. 20, p. 218.

Hot-rolled sheet changes include a combined shipment extra, less carload, of 15 cents—when sheet and strip are shipped in combination with other items, and total weight of shipment to one destination at one time is less than 40,000 lb. An extra of 15 cents for recoiling non-pickled coils and one of 40 to 60 cents for stress relief anneal now are charged. Also, 5 cents for protective oil coating of lifts, and $5 per coil for oil coating of material in transit. Application of the multiple lift package extra is clarified.

Revised list on hot-rolled carbon strip includes: Order quantity extras clarified; processing extras enlarged to include a recoiling extra of 25 cents for non-pickled coils, when mandatory to furnish ends cropped to within gage or width tolerance; heat treatment extras enlarged to include stress relief anneal at 50 cents for 0.50 per cent maximum carbon and 60 cents for over 0.60 per cent carbon; packaging and loading extras extended to include a 5 cent charge for protective oil coating.

Changes on galvanized flat sheets, galvanized sheets, paint bond sheets, formed roofing, siding and accessories, and corrugated culvert sheets include the setting up of four width brackets, 6-in., 6 to 9-in., 9 to 12-in., and 12 to 23 15/16-in. They replace

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the two formerly used, under 12 to 6-in. and under 24 to 12-in. Length extras on the narrower widths now also are included. Order quantity extras are revised to 30 cents for under 40,000 lb to 20,000 lb, as against 10 cents for 40,000 to 20,000 lb formerly; 50 cents for under 20,000 to 7000 lb, as against 20 cents for under 20,000 to 10,000 lb formerly; 85 cents for under 7000 lb to 3750 lb as against 50 cents for under 10,000 to 5000 lb formerly; and $1.25 for under 3750 lb as against 90 cents for under 5000 lb formerly. Other changes in the card include addition of a combined shipment extra of 15 cents, coil weight extra for width 6 to 12 in., as well as extras for packaging the narrower widths, ranging from 10 to 45 cents, depending upon quantity.

Extra card on vitrenamel sheets extends gage and width extras to widths 12 to 2 in.; also cut length extras and item quantity charges.

The card on long terne sheets, also revised, sets up four new brackets of gage and width extras, 6-in., 6 to 9-in., 9 to 12-in., and 12 to 23 15/16-in. Several other minor changes also are included.

Sheets, Strip . . .

Sheet deliveries are more extended as order volume begins to swell. Reports from virtually all marketing points indicate consumers are buying more actively. This is being reflected in tightening deliveries and increased mill operations.

At Pittsburgh, for example, the rise in hot-rolled and cold-rolled sheet orders prompted Pittsburgh Steel Co. to return its No. 2 blast burnace at Monessen, Pa., to operation. This stack has been idle since Aug. 11. The company has 10 of 12 open hearths in production and is aiming to shorten heat time by increasing hot metal furnace charges, while decreasing use of cold scrap in melts.

The company says the way orders are flowing in for sheets it will be fully booked on hot and cold-rolled grades for fourth quarter delivery.

Eastern consumers are ordering cold-rolled sheets farther ahead than at any time in months—reflecting mainly the scheduled early rise in automotive production, but some tonnage is available for October shipment. At the same time a lift in demand for hot-rolled sheets is noted.

On the West Coast, lead time on continuous sheets has been extended to three months. Galvanized sheets are in improved demand in the area, but Japanese galvanized sheets are being offered below domestic prices.

St. Louis district sellers foresee an average rise of 10 per cent in order volume this month over the last. The appliance industry demand is reviving and the agricultural machinery builders are ordering more actively.

Reflecting the sharp competitive situation in the sheet market generally, an Ohio producer of electrical grades, for the first time in recent years, is absorbing all freight into the Philadelphia marketing area.

Several more producers of cold-rolled sheets announced slit sheet pricing schedules, first reported in STEEL, Sept. 20, p. 218.

Steel Bars . . .

Bar Prices, Page 128

"Disappointing," is the way commercial bar sellers describe current demand. Optimism for an October pickup in volume continues fairly widespread in the market, however, but tonnage bookings for delivery that month are not imposing. In fact, prompt deliveries are available in about every bar category.

Eastern district producers are particularly disappointed. They are now pinning their hopes on October betterment, expressing confidence that automotive requirements will prod demand for carbon and alloy bars noticeably before the month is far advanced.

Much the same view is held in other producing and consuming districts. At all points automotive needs are seen holding the key to more market activity this fall.

Tubular Goods . . .

Tubular Goods Prices, Page 132

Higher zinc prices are reflected in lower discounts on galvanized standard pipe for export. United States Steel Export Co., New York, announced, effective Sept. 8, the following export price bases.

Seamless - galvanized, 2-in., plus 8.635 per cent; 2½-in., plus 5.885; 3-in., plus 3.385; 3½ and 4-in., minus 0.95; 5-in., minus 0.2; 6-in., minus 2.7; buttweld-galvanized 2½ and 3-in., minus 14.195; 3½ and 4-in., minus 4.945.

Pipe buyers are not pressing the market for tonnage quite as persistently as they were some time back. But mills continue to ship large volume and no slump is seen.

Competition from imported pipe is felt along the Gulf coast. Last week it also was reported Australia is offering small quantities of small diameter pipe on the West Coast at prices substantially under those quoted by domestic producers.

Youngstown Sheet & Tube Co. is modernizing its No. 2 seamless tube mill at its Campbell Works in Youngstown.

Structural Shapes . . .

Structural Shape Prices, Page 128

Structural market activity is off from the peak of a few weeks back, but is still at a high level. Bridges and road work continue to account for the bulk of current tonnage. Still, demand is reasonably well diversified.

These latter jobs are particularly important to smaller fabricators. Generally, they are not set up to handle bridge work. Competition among fabricators is keen. In the Pacific Northwest for instance, out-of-district fabrictors are actively bidding for area business.

Structural supply is adequate except for wide flange beams.

Steps are under way to enlarge producing facilities for wide flange beams. Recently, U. S. Steel announced plans for major improvements at its Homestead Works to meet increased demand for light wide-flange structural sections. Similar improvements are planned at the company's South Works in Chicago.

Plates . . .

Plate Prices, Page 128

Some slight improvement in plate demand is noted but volume is insufficient to support full mill operating schedules. Prompt deliveries are available. Demand for sheared plate is better than it was a month ago.

Shipbuilding needs are slightly heavier, chiefly for naval vessels. Larger tonnages are being placed direct by the Navy, including high tensile hull plates and specialtics. The Navy procurement office is closing on fairly good-sized tonnages.

Prospects for tonnage demand from freight car builders are somewhat brighter. Pending car business is the best it has been in months.

Despite slightly improved demand, mills, generally, expect no marked spurt in activity over the next few weeks. Fabricating shops continue to order hand-to-mouth with prompt shipments available. On the West Coast, fabricators' inventories are high; requirements for tank and pipeline construction are off.

Wire . . .

Wire Prices, Pages 130 & 131

Not much change is apparent in wire market conditions. Demand for manufacturers wire is slightly more active while requirements for merchant trade items appear shrinking, at least at some market centers—Pittsburgh for one. This is explained in part by the seasonal decline in ordering of welded mesh for reinforcing.

Possibly the most encouraging development in the market is the reported quickening of rod buying.

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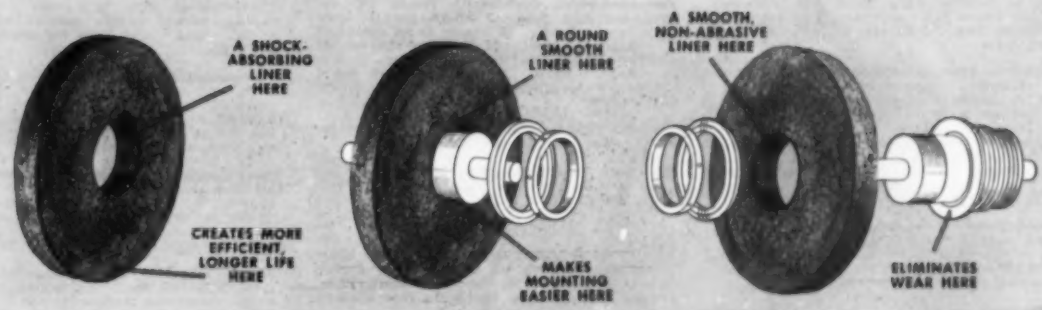
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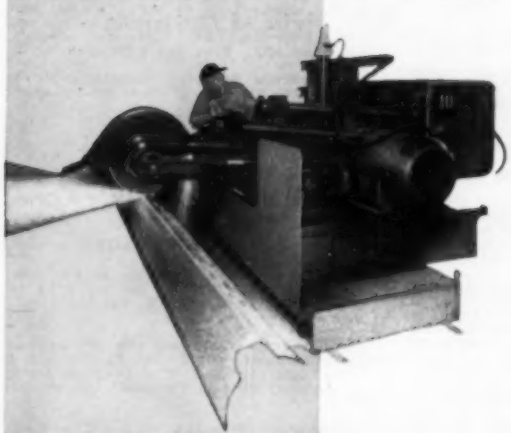

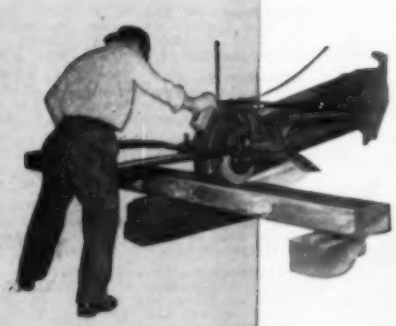

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MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala; Portland, Oreg. and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electromanganese: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb or alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 34.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c pek pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.85c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.05c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract. c.l. bulk 12.65c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less to 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld, Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20 % each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, Pa., $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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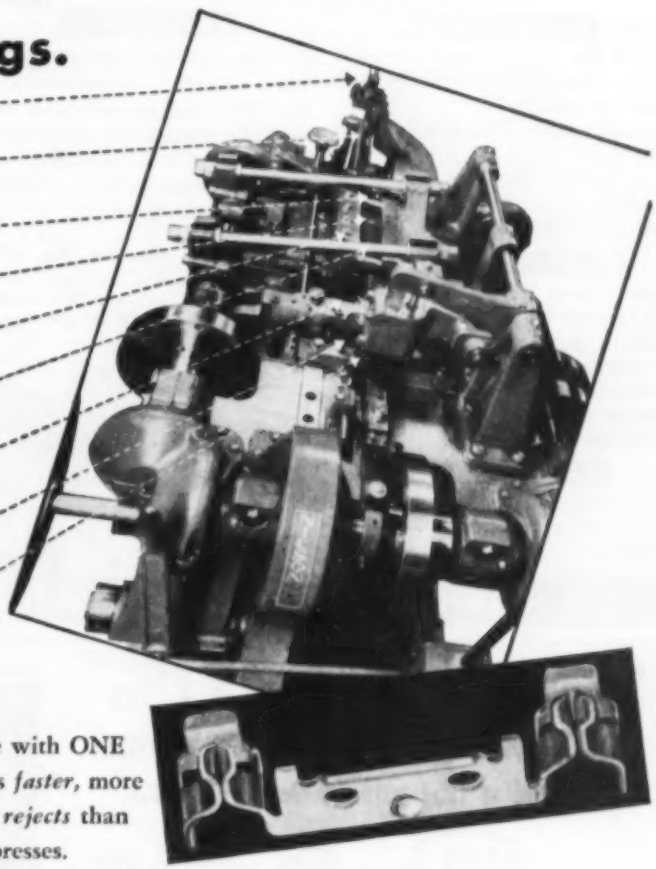

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Slotted patterns from .006 wide, upward. Squares, triangles, ornamental and special shapes in a wide range of patterns, spacings and arrangements.

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Warehouse . . .

Warehouse Prices, Page 133

Distributors and custom processors are not too seriously alarmed by revision in mill extra cards on cold-rolled sheets (STEEL, Sept. 20, p.218). They had been doing a substantial volume of business in narrow slit sheets in recent years.

Since World War II, the slitting of wide coils into narrow widths has become "big business." This developed when mills discontinued quoting commodity strip, (narrow material carrying nominal extras), and listed material narrower than 12 in. as strip commanding a higher price.

Contract slitters expect to hold the bulk of this business, claiming they still can save consumers $6 to $8 a ton, and, in addition, make prompter deliveries than are available from the mills. Slitters also point out they serve as warehouses for sheet buyers, making it possible for users to order tonnage as needed. Also, under this arrangement, consumers can change specifications almost on a moment's notice, which is impossible if they depend solely on direct-mill shipments.

In the Philadelphia district, leading distributors of hot-rolled products established an extra of 70 cents per 100 lb on quantities of 30,000 lb and over, eliminating the previous bracket which called for a 50-cent extra on quantities of 40,000 lb. This ties in closely with truck shipments.

Other changes in that district include an advance in cold-finished rounds to 8.36c from 8.19c and a rise in hot-rolled alloy bars (4140) to 12.11c from 11.69c. County pricing policy, introduced recently by Horace T. Potts Co., has been adopted by at least one other distributor.

Stainless Steel . . .

Stainless Prices, Page 132

Armco Steel Corp., Middletown, O., announces commercial production of a specialized variety of columbium-stabilized steel products. Last week it issued a list of price bases.

Requirements for type 347 stainless with low tantalum content are virtually all confined to applications in nuclear energy projects.

Because of the need for this special-quality, columbium-stabilized stainless steel in national defense projects, Armco is establishing the alloy as a regular company grade. Prices, cents per pound are: Forging billets, 48.25; bars, wire and structurals, 57.50; plates, 62.25; sheets, 70.50; cold-rolled strip, 70.50.

Type number of the low tantalum alloy has been designated as 348.

Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$24.00-25.00
Domestic sheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 80c-83c.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	nom. 34.00

Domestic

(Rail nearest seller)

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$3.80-$4.20
60-65%	4.65-4.75

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haideman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill. Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, Niles, O., Hays, Pa., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillion, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala. $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Jonhstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Peria, Ark., $100; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $176; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	26.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O. deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net ton, duty paid, metallurgical grade: European, $28-30; Mexican, $25.50.

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Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.35

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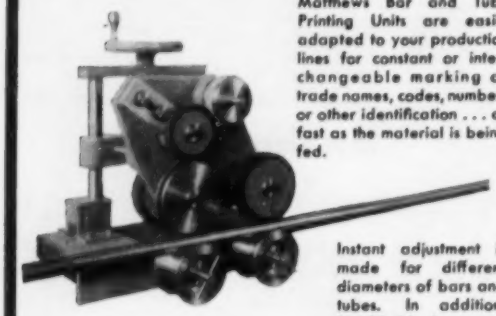

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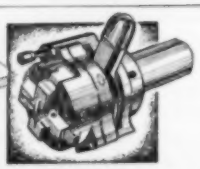

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Scrap . . .

Scrap Prices, Page 146

Philadelphia—Domestic interest in steel scrap shows signs of stirring. One district mill, out of the market for two months, is negotiating for tonnage. One consumer, competing with the export market, has established prices on No. 2 bundles at the higher level of $23, delivered. Prices on mixed borings and turnings have jumped to $19, delivered, on buying by one large mill, and prices on short shovel turnings are a shade higher at $20, delivered, on modest trading. Heavy turnings are nominally higher at $27, although no consumer buying has been noted at that level. Heavy breakable cast is easier at $35.50, delivered.

New York—Brokers have advanced their buying prices on No. 2 bundles 50 cents a ton to a range of $17 to $18. All other prices are unchanged.

Buffalo — The tone of the scrap market is stronger as mill buying boosted top quality steelmaking grades $1 per ton to a range of $28 to $29. Cast grades also are up $1 on sustained demand from Canadian buyers. Supplies are decreasing and dealers appear hesitant to accept additional business at current price levels.

Pittsburgh—Scrap prices are unchanged except for punchings and plate scrap. That grade went up $1 to $33-$34 largely in response to the earlier upward movement of $1 by cut structurals. As the turn of the month nears, brokers hope for mills to do some new buying. Scrap moving now is on old orders.

Detroit—The scrap market is strong with dealers looking for fall to bring a price upturn. On the strength of this optimism, prices are generally moving up slightly, with a possibility that further increases will be scored.

Cleveland—Top quality steelmaking grades of scrap advanced $1 per ton last week on moderate purchases by two local mills. Local delivery purchases of blast furnace grades also put prices up $1 on those items. As a result, heavy melting steel is quoted at $30 to $31 and blast furnace material at $17 to $18.

Youngstown—The low rate of steel production in the district is keeping the scrap market unsettled. Prices have firmed up slightly, however, mainly on the basis of better prices elsewhere.

Cincinnati — Low phos scrap rose $1 a ton to $33 to $34 in this area. This was the only price change reported. The market is expected to remain quiet the balance of this month.

Chicago—Dealers are still waiting for the mills to increase operations. Minor price revisions on No. 2 heavy melting steel last week put prices up $1 to a range of $28 to $29. Scattered reports have rerolling rail going at $46 to $49, up from $45 recently.

St. Louis—The scrap market's improved undertone continues. Quality melting steel grades have crept up about $1 under mildly increased mill buying, reflecting a pick up in operations the last two weeks.

Los Angeles—Uncertainty in the scrap market is accented by speculative buying. Prices on No. 1 cupola cast, steady at $44 for several months, fluctuated between $40 and $45 during September.

San Francisco—Moderate amounts of cast grades are being moved to this market from Los Angeles.

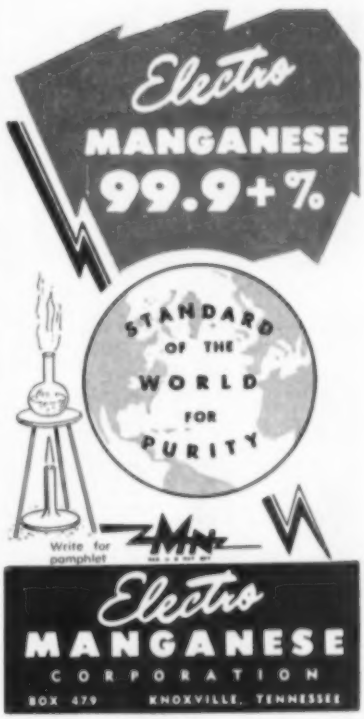
August Iron Production Off

Blast furnace production continued to decline in August, reports the American Iron & Steel Institute.

Output was 4,567,035 net tons, of which 4,529,291 were pig iron and 37,744 ferromanganese and spiegeleisen. This compares with July production of 4,626,184 tons, of which 4,590,076 were iron and 36,108 ferromanganese and spiegeleisen.

In August, 1953, production totaled

(*Please turn to page* 148)



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229 Main Street Belleville 9, New Jersey

Exclusive territories available to qualified distribution organizations.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

COMPOSITE STEELMAKING SCRAP

Sept. 22	$29.75
Sept. 15	29.75
Aug. Avg.	28.80
Sept., 1953	36.93
Sept. 1949	26.07

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	30.00-31.00
No. 2 bundles	24.00-25.00
No. 1 busheling	29.00-30.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals, 5 ft lengths	32.00-33.00
Heavy turnings	26.00-27.00
Punchings & plate scrap	*33.00-34.00*
Electric furnace bundles	32.00-33.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	32.00-33.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	25.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 2-ft and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-190.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	25.00-26.00
No. 1 bundles	*30.00-31.00*
No. 2 bundles	23.00-24.00
No. 1 busheling	*30.00-31.00*
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*17.00-18.00*
Cast iron borings	*17.00-18.00*
Low phos.	30.00-31.00
Cut structural plate 2 ft and under	*35.00-36.00*
Alloy free, short shovel turnings	17.50-18.50
Electric furnace bundles	*30.00-31.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	26.50-27.50
Stove plate	33.00-34.00
Heavy breakable cast	25.50-26.50
Unstripped motor blocks	25.00-26.00
Brake shoes	29.00-30.00
Clean auto cast	43.00-44.00
No. 1 wheels	35.00-36.00
Burnt cast	27.00-28.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	41.00-42.00
Rails, 3-ft and under	43.00-44.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Cast steel	34.00-35.00
Railroad specialties	35.00-36.00
Uncut tires	36.00-37.00
Angles, splice bars	41.00-42.00
Rails, rerolling	45.00-46.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
480 clips, bundles, solids	nom. 70.00
480 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	32.00-33.00
No. 2 bundles	23.00-24.00
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	33.00-34.00
Electric furnace bundles	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	26.50-27.00
No. 1 bundles	28.50-29.00
No. 2 bundles	*23.00*
No. 1 busheling	28.50-29.00*
Electric furnace bundles	29.00
Machine shop turnings	16.00-16.50
Mixed borings, turnings	*19.00*
Short shovel turnings	*20.00*
Structurals & plate	30.00-31.00
Heavy turnings	*27.00**
Couplers, springs, wheels	32.00-33.00
Rail crops, 2 ft & under	42.00-43.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Malleable	37.00*
Heavy breakable cast	*35.50*
Unstripped motor blocks	nom.
Drop broken machinery	41.00-42.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	21.00-21.50
No. 2 heavy melting	18.00-19.00
No. 1 bundles	21.00-21.50
No. 2 bundles	*17.00-18.00*
Machine shop turnings	8.00-8.50
Mixed borings, short turnings	11.00-12.00
Low phos. (structural & plate)	25.00-26.00
Short shovel turnings	11.00-12.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	19.00-20.00*
No. 2 heavy melting	15.00-15.50
No. 1 bundles	19.00-20.00
No. 2 bundles	14.00-15.00
Mixed borings, turnings	9.00-10.00
Machine shop turnings	5.00-5.50
Short shovel turnings	10.00-11.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

* $4 to $4.50 higher for export.

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.50-26.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	25.50-26.50
No. 2 bundles	19.00-20.00
No. 1 busheling	25.50-26.50
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.50-15.50
Short shovel turnings	14.50-15.50
Cast iron borings	14.50-15.50
Low phos. 18-in.	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	44.00

Railroad Scrap

No. 1 R.R. heavy melt	31.00-32.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	36.00-37.00

CHICAGO

No. 1 heavy melting	29.00-31.00
No. 2 heavy melting	*28.00-29.00*
No. 1 factory bundles	31.00-32.00
No. 1 dealer bundles	28.00-29.00
No. 2 bundles	22.00-23.00
No. 1 busheling	29.00-31.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3-ft	32.00-33.00
Punchings & plate scrap	33.00-34.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	29.00-30.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	39.00-40.00
Drop broken machinery	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	40.00-42.00
Rails, 2-ft and under	45.00-46.00
Rails, 18-in. and under	46.00-47.00
Angles, splice bars	38.00-39.00
Rails, rerolling	*46.00-49.00*

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	20.00-25.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*23.00*
No. 2 heavy melting	*19.50*
No. 1 bundles	*24.00*
No. 2 bundles	*17.00*
No. 1 busheling	*23.00*
Machine shop turnings	*10.00*
Mixed borings, turnings	*10.00*
Short shovel turnings	*13.00*
Punchings & plate scrap	24.00

Cast Iron Grades

No. 1 cupola	33.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	23.00
Unstripped motor blocks	18.00
Clean auto cast	37.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	22.50-23.50
No. 1 bundles	*28.00-29.00*
No. 2 bundles	20.50-21.50
No. 1 busheling	*28.00-29.00*
Machine shop turnings	13.50-14.50
Mixed borings, turnings	17.00-17.50
Short shovel turnings	18.00-18.50
Cast iron borings	17.00-17.50
Low phos.	30.50-31.50

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	35.00-36.00
No. 1 machinery	39.00-40.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3 ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	*23.00-24.00*
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	18.00-19.00
No. 2 bundles	*21.00-22.00*
Cast iron borings	15.00-16.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	*28.00-29.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*45.00-46.00*
Stove plate	*42.00-43.00*
Bar crops and plate	30.50-31.50
Structural plate, 2 ft	30.50-31.50
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	*28.00-29.00*
Rails, 18-in. and under	*39.00-40.00*
Rails, rerolling	39.00-40.00
Angles, splice bars	*37.00-38.00*
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*26.50*
No. 2 heavy melting	*24.50*
No. 1 bundles	*26.50*
No. 2 bundles	*20.50*
Machine shop turnings	14.00
Short shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	40.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	*33.50*
Rails, 18-in. and under	*43.00*
Rails, random lengths	*40.00*
Rails, rerolling	*49.00*
Angles, splice bars	35.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	25.00
No. 2 heavy melting	21.00
No. 1 bundles	21.00
No. 2 bundles	17.00
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Heavy breakable cast	23.00
Unstripped motor blocks	23.00
No. 1 wheels	31.00
Stove plate (f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	42.00-46.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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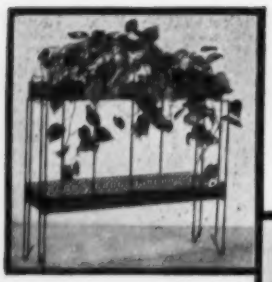

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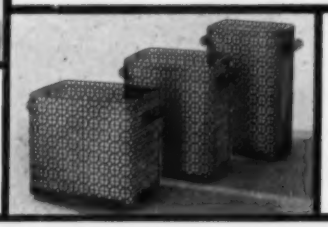

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Atmosphere Generators • Ammonia Dissociators • Gas Conditioning Equipment

(*Concluded from page* 145)

6,471,554 tons, of which 6,391,749 were pig iron and 79,805 ferromanganese and spiegeleisen.

Furnace operations averaged 65.6 per cent of capacity in August this year against 66.6 in July and 96 in August last year.

Cumulative production in the first eight months this year was 38,384,901 net tons, consisting of 38,018,591 tons of iron and 366,310 tons of ferromanganese and spiegeleisen. In the like period last year 51,301,590 tons were produced, 50,722,997 tons of iron and 578,593 tons of ferroalloys.

Pig Iron . . .

Pig Iron Prices, Page 133

Some improvement is seen in pig iron, but the extent depends largely on the area. Most producers place the low point in July or August, with steady but small improvement each succeeding month. New York and Cleveland are the most optimistic, with Philadelphia and Chicago staying on the conservative note. Should there be a greater upturn, the feeling is it will be in late October or early November.

Iron Ore . . .

Iron Ore Prices, Page 143

Consumption of iron ore in the U. S. and Canada during August totaled only 4,894,874 gross tons, reports the Lake Superior Iron Ore Association. This was below consumption of 5,155,028 tons in July, and was off sharply from the 8,150,002 tons taken in August, 1953.

Cumulative consumption this year through August was 44,822,658 tons, compared with 64,513,433 in the like period of last year.

Total stocks of ore on lower lake docks and furnaces at the end of August were reported at 45,732,804 gross tons. This compares with 40,723,061 at end of July and 45,579,307 tons at the end of August a year ago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3000 tons, office building, Travelers Insurance Co., Hartford, Conn., to American Bridge Division, U. S. Steel Corp., Pittsburgh, direct by owner; George A. Fuller Co., New York, general contractor.

1100 tons, state bridge, Chester county, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

1060 tons, Washington state Skagit river bridge, to Poole, McGonigle & Dick, Portland, Oreg.; Peter Kiewit Sons Co., Longview, Wash., general contractor, low at $1,328,367.

1050 tons, superstructure section, central artery, Boston, contract J-2, bids direct to State Highway Department, to Ernest Iron Works, Buffalo, at $434,985.

530 tons, Southeast Catholic girls high school, Philadelphia, to Belmont Iron Works, Eddystone, Pa.

375 tons, alterations, Yorktown hotel, York, Pa., to Vulcan Rail & Construction Co., Baltimore.

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IRON & STEEL PRODUCTS, INC.
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Chicago 33 Illinois
Phone: Mitchell 6-1212
New York Office
50-d Church Street
New York 7, New York
Phone: BEekman 3-8250
"*ANYTHING* containing IRON or STEEL"

WANTED
SURPLUS ROD & BAR
Stainless—Aluminum—Steel—Brass
Any size type and quantity. Cash for termination inventories.
Send list to:
COLLINS ENGINEERING COMPANY
9050 Washington Blvd. Culver City, Calif.

WANTED
SURPLUS AIRCRAFT PARTS
or termination inventories.
Get our cash offer by return mail.
Send lists to:
COLLINS ENGINEERING COMPANY
9050 Washington Blvd. Culver City, Calif.

HYDRAULIC PRESS FACILITY
Available on Contract
Established Chicago Manufacturing firm offers services of complete hydraulic press facility for your product. Presses up to 1525 tons capacity; 48" x 72" bed; 100" daylight; 48" ram stroke. Housed in own modern building with ample supplementary space, R.R. siding, loading facilities. 24-hour operation. A letter outlining your requirement will bring you full details immediately.
Address Box 127, STEEL
Penton Building **Cleveland 13, Ohio**

WANTED
NEW PRODUCTS
AAA rated metal fabricating and manufacturing concern located in Milwaukee, Wisconsin wants to add new lines. Has national distribution thru nine branch offices.
Equipment includes presses, shears, arc welders, spot welders, planers, dry disc grinders, millers, lathes, etc. Plant is generally equipped for working heavy sheet steel and light to medium steel plate and shapes. 50,000 square feet available.
Write to Box 121, STEEL
Penton Building
Cleveland 13, Ohio

Shock Absorbers

...are painted with the
RANSBURG NO. 2 PROCESS
using disc-type atomizer

A leader in the field, The Gabriel Company, Cleveland, uses the Ransburg No. 2 Process to apply the protective coating to its line of shock absorbers which vary in size from 4" to 26" in length.

● Efficiency and production in the finishing of shock absorbers progressively improved at The Gabriel Company, when—over a period of years—they went from dip to Ransburg No. 1 Process, then to the Ransburg No. 2 Process, with the disc-type atomizer.

Efficiency was stepped up measurably when the No. 1 Process of electrostatic spray painting replaced dip method in the application of the protective coating to the completely-assembled shocks.

NOW, with the even-more-efficient No. 2 Process—with disc-type atomizer—Gabriel is painting 1000 pieces per gallon of paint where they formerly finished 350! Production is up, too—almost doubled—jumping from 1000 to nearly 2000 units per hour. In addition to paint savings, they are getting a consistent, high quality finish and an even, protective coating over all areas of the product.

This is another on-the-job example of what Ransburg No. 2 Process is doing on production lines all over the country. We'd like to talk to you about the possible savings in your finishing department. Or, write for our brochure on Ransburg Electrostatic Painting Processes.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana
RANSBURG

205 tons, addition to Port of Seattle grain elevator, to Leckenby Structural Steel Co., Seattle; Kerr, Gifford & Co., lessees.

90 tons, high school, Seward, Alaska, to Isaacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

5200 tons, viaduct and ramp, Northeast expressway, Chelsea, Mass.; Berke-Moore Co., Boston, low on general contract.

2000 tons, hangar, shops, etc., pre-flight facilities, Larson Air Field, Moses Lake, Wash.; bids to Boeing Airplane Co., Seattle, Oct. 5.

1270 tons, state turnpike bridgework, Lehigh county, Pa.; bids closed Sept. 23.

1070 tons, bridge work, Newark Bay-Hudson county turnpike extension, New Jersey; bids Oct. 14; also required are 380 tons of reinforcing steel, 1600 feet of steel piles and 1200 feet of metal railing.

860 tons, state bridge, Montgomery county, Pa.; bids Oct. 7.

400 tons, state bridges, Billerica-Chelmsford, Mass., bids in.

385 tons, state highway bridges, Athol-Phillipston, Mass., S. & M. Construction Co., Providence, R. I., low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

550 tons, Washington state Skagit river bridge to Soule Steel Co., Portland, Oreg.; Peter Kiewit Sons Co., Longview, Wash., general contractor.

88 tons, additional for Washington state office building, Olympia, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; McDonald Building Co., Tacoma, Wash., general contractor. This is in addition to 675 tons for the same job placed in January.

REINFORCING BARS PENDING

380 tons, Newark Bay-Hudson county turnpike extension, New Jersey, bids Oct. 14; 1070 tons of structural steel also will be required among other items.

360 tons, Garden State parkway, Cape May county, New Jersey, bids Oct. 4; total comprises 102 tons for contract No. 176, section 11; 101 tons for contract No. 177, section 11; 157 tons for contract No. 178, section 13. Bids will be taken on the basis of three separate contracts or a single combined contract.

200 tons, Washington state twin girder bridges, Spokane county; bids to Olympia, Wash., Oct. 5.

105 tons, regulating gate structure, Fort Randall reservoir project, near Pickston, S. Dak.; bids Oct. 15, Corps of Engineers, Omaha, Nebr.

100 tons, general warehouse, Ft. Richardson, Alaska; general contract to Grove, Shepherd, Wilson & Kruge Inc., Seattle, low $1,581,159 to U. S. Engineer.

100 tons, ammunition magazines, Whittier, Alaska; Morrison-Knudsen Co., Seattle, low base contract, $292,632.

PLATES . . .

PLATES PLACED

100 tons, fuel storage tanks, Greenville Air Force Base, Greenville, Miss., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

350 tons, special treatment; bids Oct. 6, Navy Purchasing Office, Washington.

PIPE . . .

STEEL PIPE PENDING

Unstated, 30,000 feet, ¾ in. galvanized steel, 15,000 feet, 1 in., 7000 feet 1¼ in., and 11,000 feet, 2 in.; bids to Seattle Sept. 21.

RAILS, CARS . . .

RAILROAD CARS PLACED

Rock Island, 100 box cars to Pullman-Standard Car Mfg. Co., Chicago.

Union Pacific, 35 sleeping cars to Pullman-Standard Car Mfg. Co., Chicago.

Western Pacific, 100 double door 50-ft box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Advertising Index

Aetna-Standard Engineering Co., The ..... Inside Back Cover
Allegheny Ludlum Steel Corporation 13
Allis-Chalmers ..... Inside Front Cover
Aluminum Company of America 99, 100, 101, 102
American Chain & Cable, American Chain Division 127
American Chemical Paint Co. 136
American Monorail Co. 115
American Roller Die Corporation 77
American Screw Co. 21
American Society for Metals 7
American Welding & Manufacturing Co., The 32
American Zinc, Lead & Smelting Co. 125
American Zinc Sales Co. 125
Armstrong-Blum Mfg. Co. 35
Atlas Car & Mfg. Co., The 10

Barber-Colman Co. 8
Bart Manufacturing Corporation 145
Bedford Foundry & Machine Co., Inc. 12
Belmont Iron Works, The 144
Beryllium Corporation, The 118
Bethlehem Steel Co. 1
Bullard Co., The 26

Chemical Corporation, The 5
Chicago Steel Service Co. 49
Cincinnati Milling Machine Co., The 50
Cincinnati Shaper Co., The 25
Clark Bros. Co. 108
Cleveland Hotel 60
Cleveland Steel Tool Co., The 144
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 93
Cold Metal Products Co., The 91
Collins Engineering Co. 149
Cooper-Bessemer Corporation, The 15
Cowles Tool Co. 144
Crucible Steel Company of America 73

Danly Machine Specialties, Inc. 110, 111
Detroit Steel Corporation, Reliance Steel Division 36
Dulien Steel Products, Inc. 149

Eastern Machine Screw Corporation, The 144
Electric Controller & Manufacturing Co., The 82
Electric Storage Battery Co., The, Industrial Division 123
Electro Manganese Corporation 145

Fairbanks, Morse & Co. 113
Fansteel Metallurgical Corporation, WW Alloys, Inc. Division 76

General American Transportation Corporation 68
Gisholt Machine Co. 17, 18, 19, 20
Great Lakes Steel Corporation 54

Harrington & King Perforating Co., The 142
Hendrick Manufacturing Co. 148
Heppenstall Co. 62
Holliday, W. J., & Co., Inc. 152
Horsburgh & Scott Co., The 27
Hubbard, M. D., Spring Co. 144

Inland Steel Co. 40
Iron & Steel Products, Inc. 149

Jones & Lamson Machine Co. 28
Jones & Laughlin Steel Corporation 107, 134

Kenilworth Steel Co., The 61
Kennametal, Inc. 24

Lake Erie Engineering Corporation 11
Lamson & Sessions Co., The 97
Lapointe Machine Tool Co., The 23
Lee, K. O., Co. 142
Lima Electric Motor Co., The 75
Lowden Machinery Co., The 57
Lurie Brothers & Co., Inc. 147

Matthews, Jas. H., & Co. 144
Mesta Machine Co. 78, 79
Metzgar Conveyor Co. 142
Mid-West Abrasive Co. 139
Motch & Merryweather Machinery Co., The 67
Murray-Way Corporation 58

National-Standard Co. 29
National Steel Corporation 54
Nilson, A. H., Machine Co., The 141

Ohio Crankshaft Co., The 2
Osborn Manufacturing Co., The 3
Ottawa Steel Products, Inc. 60

Pangborn Corporation 151
Peerless Steel Specialties 149

Ransburg Electro-Coating Corporation 150
Reliance Steel Division, Detroit Steel Corporation 36
Republic Steel Corporation, Alloy Steel Division 14
Rigidized Metals Corporation 144
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 81
Ryerson, Joseph T., & Son, Inc. 39

Sargeant & Wilbur, Inc. 148
Seaboard Steel Co., Inc. 149
Service Steel 144
Spee-Flo Co., The 9
Standard Oil Co. (Indiana) 70, 71
Sun Oil Co., Industrial Products Department 65

Thomas Flexible Coupling Co. 72
Thomas Machine Manufacturing Co. 137
Thompson Grinder Co., The 117
Timken Roller Bearing Co., The, Steel & Tube Division ..... Back Cover
Townsend Co. 94, 95

Ulbrich Stainless Steels 6

Veeder-Root, Inc. 4

WW Alloys, Inc., Division of Fansteel Metallurgical Corporation 76
Ward Steel Co. 16
Washburn Wire Co. 22
Wean Equipment Corporation 30, 31
Wheland Co., The 16
Williams Machinery Co. 149

Table of Contents, Page 5

Classified Advertising, Page 149

PANGBORN BLASTS by don herold

When those small metal parts call out, "Hey, cleaning time!"
And you have to remove scale, old paint, rust or grime . . .

You can clean them in seconds and save money, too —
Pangborn's Blast Cleaning Cabinet's made just for you.

It produces a finish so smooth and so clean,
It will do the best job that you ever have seen.

Pangborn Blast Cleaning Cabinet

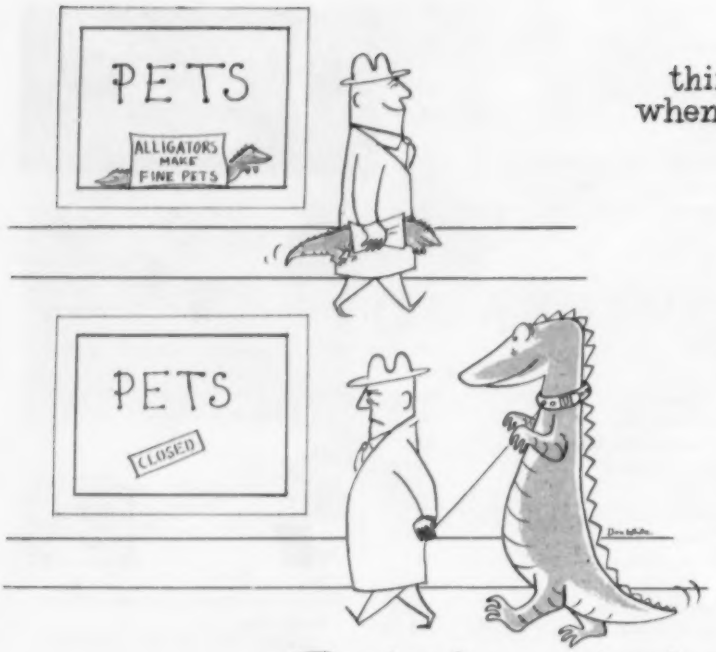
for efficient, low-cost cleaning of metal parts. Cleans pieces up to 35" x 60" in size. Models from $319 and up.

For details, write:
PANGBORN CORP., 1600 Pangborn Blvd., Hagerstown, Maryland

Pangborn

BLAST CLEANS CHEAPER
with the right equipment for every job

50th Anniversary Medallion



things to watch for
when buying alligators . . .

But if you're buying special purpose STEELS, may we recommend the SPEED STEELS

SPEED CASE — a low carbon free machining open hearth steel

SPEED TREAT — a medium carbon free machining open hearth steel

SPEED ALLOY — a chromium alloy steel

briefly they

- ✓ are easy to heat-treat
- ✓ are fast machining
- ✓ give longer tool life
- ✓ produce better finishes

THERE ARE SPEED STEEL SPECIALISTS IN...

☐ Akron, Ohio	Burger Iron Co.
☐ Bridgeport, Conn.	Bridgeport Steel Co.
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☐ Cambridge (Boston), Mass.	Brown Wales Co.
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☐ Dallas, Tex.	Earle M. Jorgensen Co.
☐ Detroit, Mich.	Peninsular Steel Co.
☐ Hammond, Ind.	W. J. Holliday & Co., Inc.
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☐ Memphis, Tenn.	Pidgeon-Thomas Iron Co.
☐ Newark (New York), N.J.	Grammer, Dempsey & Hudson, Inc.
☐ Oakland (San Francisco), Calif.	Earle M. Jorgensen Co.
☐ Philadelphia, Pa.	Horace T. Potts Co.
☐ Toronto, Ontario	Peckover's, Ltd.
☐ Tulsa, Okla.	Earle M. Jorgensen Co.

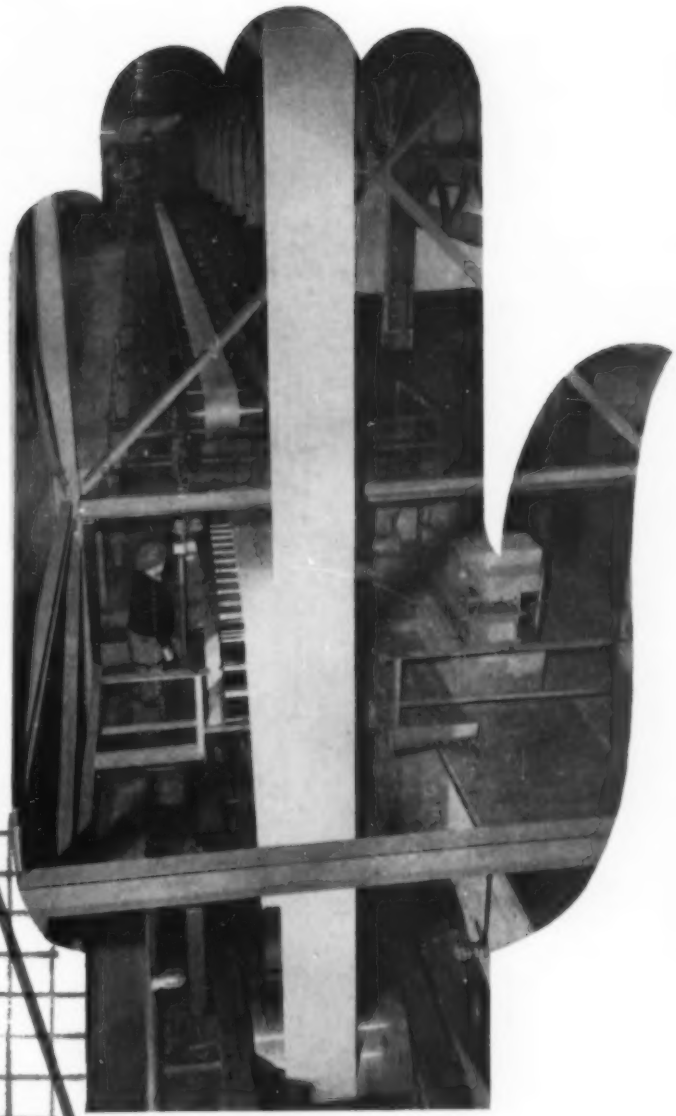
W. J. Holliday & Co., Inc.

141 141st STREET • HAMMOND, INDIANA

Speed steels are produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division

good equipment keeps production costs

DOWN



seamless tube mills
continuous butt weld pipe mills
continuous coating lines
flat-rolled finishing equipment
drawbenches

SUBSIDIARY and ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd., Middlesbrough, England — Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castellvi, Inc., New York, N. Y. — Mexico, Central and South America.
Societe de Constructions de Montbard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
Hale & Kullgren, Inc., Akron, Ohio — Representative for the Rubber Industry.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries

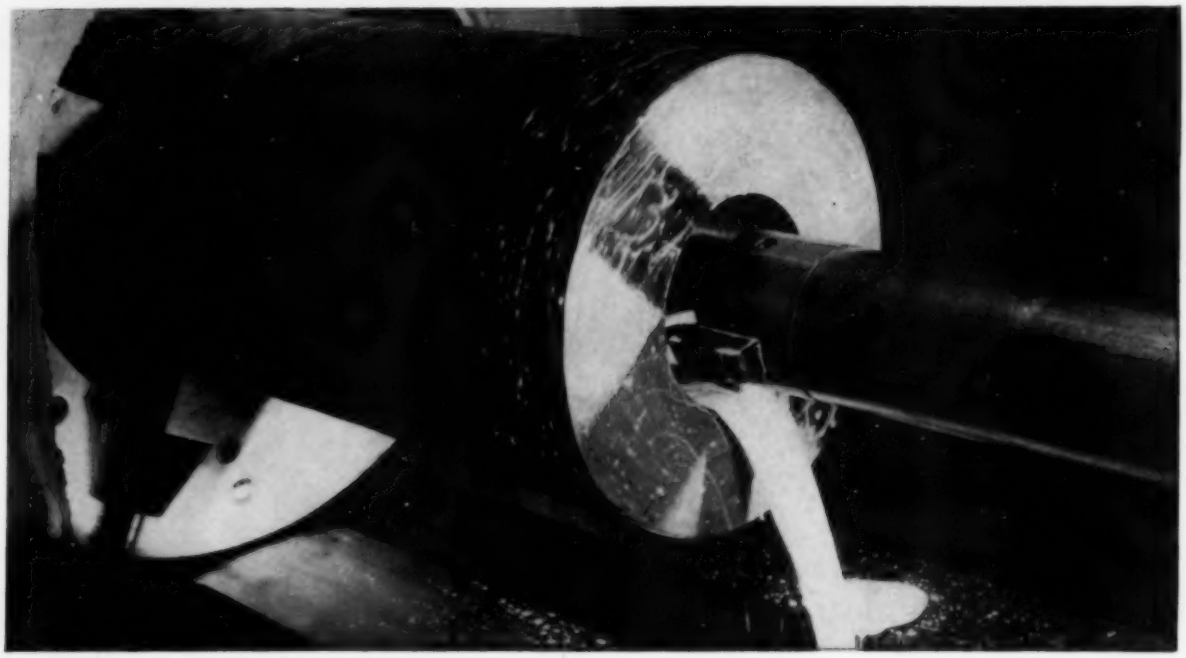
THE AETNA-STANDARD ENGINEERING COMPANY · PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO · ELLWOOD CITY, PENNSYLVANIA

51 YEARS OF CREATIVE ENGINEERING IN CAPITAL INVESTMENT EQUIPMENT

START WITH FINISH BORING!



TIMKEN® seamless steel tubing saves steel, machining time!

FINISH boring is your first production step when you use Timken® seamless steel tubing instead of bar stock for your hollow parts jobs. You don't have to bore out the center hole. With Timken seamless tubing, it's "built-in"! So screw machine stations are available for other jobs. You add machining capacity without adding machines.

Because the center hole is already there, you also save steel with Timken seamless tubing. There's far less metal to machine away, giving you more parts per ton of steel.

To save you even *more* steel, the Timken Company's engineers will study your problem and recommend the most economical tube size for your hollow parts job—a size guaranteed to clean up to your dimensions.

Timken seamless tubing results in a better quality product, too. The piercing operation by which Timken tubing is made is basically a forging operation. This gives the tubing a uniform spiral grain flow and a refined grain structure that brings out the best in the quality of the metal. And this quality is uniform from tube to tube and heat to heat, due to the Timken Company's rigid quality control. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING